

PACIFIC DISCOVERY

FIFTY CENTS



CALIFORNIA ACADEMY OF SCIENCES

SEPTEMBER-OCTOBER 1958

VOLUME XI • NUMBER 5



the many faces of the far east

Editor and Art Director: DON GREAME KELLEY; Managing Editor: ROBERT C. MILLER; Associate Editors: IRA L. WIGGINS (Stanford University), A. STARKER LEOPOLD (University of California); VERONICA J. SEXTON, BENJAMIN DRAPER, ROBERT T. ORR, ALLYN G. SMITH (California Academy of Sciences); Special Correspondent: THANE RINEY (Southern Rhodesia)
Advertising and Circulation Manager: GARY B. BARRETT

TWO YEARS AGO the Department of Conferences of the University Extension, University of California, put on in Berkeley and San Francisco a lecture series about "Land and Life of California," once a week in each city for nine autumn weeks. Enough people signed up, and paid a fee, to hear professors discourse on the geological origins of our diverse landscape and on the Indians who first inhabited it, to ensure continuance of the series. Last fall the series took up California art and architecture. For 1958 it is "Flora and Fauna," and we mention it here with some pride. For of the ten speakers, six are of the California Academy of sciences and also *PD* editors or contributors. And one of the other four has appeared in *PD*. These are the "Land and Life" speakers and their subjects, in order (dates and places are given on page 32):

Dr. Robert C. Miller, Director, California Academy of Sciences—"Birds of Hillside and Garden in the Bay Area"; Dr. A. Starker Leopold, Professor of Zoology and Associate Director of the Museum of Vertebrate Zoology, University of California, Vice-President of the Academy—"Migratory Water Birds"; Dr. Edward S. Ross, Curator of Insects at the Academy—"Insects"; Dr. Oliver P. Pearson, Lecturer in Zoology and Research Associate, Museum of Vertebrate Zoology—"Common Night-feeding Animals"; Dr. Joel W. Hedgpeth, Director, Pacific Marine Station, College of the Pacific—"Life Between the Tides"; Dr. Nicholas T. Mirov, Plant Physiologist, California Forest and Range Experiment Station, U.S. Forest Service—"Pine Forests of the West Coast"; Dr. Paul C. Hutchison, Senior Botanical Garden Botanist, University of California—"Native and Introduced Cacti and Other Succulents"; Dr. Ira L. Wiggins, Professor of Biology and Director of Natural History Museum and Dudley Herbarium, Stanford University, President of the Academy—"Wild Flowers"; Dr. Lloyd C. Ingles, Professor of Zoology, Fresno State College, Academy Council Member—"Mammals of California." Tenth man is the series coordinator, your editor. We hope many Bay Area readers will come.

THE ACADEMY'S DIRECTOR for twenty years, Dr. Robert C. Miller editorializes on "Breaking New Ground" not only with authority but, we are sure, with feeling. In his time he has seen the Academy grow. Membership has at least doubled. The physical plant, with the building now under construction, has all but doubled. Not to be measured by file cards or cubic yards is the Academy's growth in prestige and influence with the general public. Some idea of the Academy's lengthened reach into the community, under Dr. Miller's guidance, could be gained by adding up the people who have watched "Science in Action" on TV, attended the Morrison Planetarium, and—may we say it—read *Pacific Discovery*. Those of us who know R.C.M. have no fear of his resting now on his record—we are quite sure he is quietly cooking up new ideas for keeping us busy the next twenty years. . . . ¶A curator is one who takes care of something. It seems to us that, as Curator at Marineland of the Pacific (down the coast a piece from the Golden Gate), Ken Norris deliberately went to a great deal of effort to get himself something really big to worry about. . . . ¶The "Eskimo Hunters" story in three parts, by Richard D. Taber of Montana State University School of Forestry, concludes with this issue. . . . ¶Don Greame Kelley confesses to D.G.K. that, as in the well known ad formula, his friends all laughed when he set out last October with his cameras, etc., etc. Well, his wife—his closest, probably his wisest, critic—has been heard to remark: "Frankly, I'm amazed Don brought back anything usable at all—never taken pictures before, you know." . . . ¶Weldon F. Heald's passion for collecting geographical superlatives of the West struck new depths in western Mexico's famed gorges of the Sierra Madre. (We owe him an apology with regard to the map: the decision to run the article this issue was too late to allow his checking of the drawing to spot in more of the places he mentions. Any errors or omissions are editorial.) . . . ¶Charles F. Hagar's "Galileo Story" current at the Morrison Planetarium inspired his article.

PRE-DISCOVERY

IN THIS ISSUE

EDITORIAL

- Breaking New Ground* 1
The Big One Got Away
KENNETH S. NORRIS 3
Eskimo Hunters: 3. (Conclusion)
Big Game on the Chukchi
RICHARD D. TABER 10
Far East Faces. Photographs by
DON GREAME KELLEY 14

- ROADS TO DISCOVERY: *How Deep*
Are Those Mexican Barrancas?
WELDON F. HEALD 22

- ASTRONOMY: *Galileo Galilei—*
Messenger of Stars 28

- REVIEWS 29
Academically Speaking 32



THE COVER

THE APSARAS, dancing water nymphs of Angkor, have charmed archeologists, tourists, and all visitors to the fabulous Cambodian ruins during the past hundred years, just as they delighted Khmer kings and priests in the 12th and 13th centuries. Taken at Angkor Wat by the editor (see page 14).

Pacific Discovery is published bimonthly at Gillick Press by the California Academy of Sciences. Publication office: 2057 Center Street, Berkeley 4. Editorial, Advertising and Circulation offices: Golden Gate Park, San Francisco 18. Annual subscriptions: U.S., \$3; Foreign, \$3.50. Single copies, 50c. Members of the Academy subscribe through their dues. Entered as second-class matter, February 17, 1948, at the Post Office, Berkeley 4, California, under the act of August 24, 1912.

Copyright 1958 by
California Academy of Sciences

AT THE POSSIBLE RISK of seeming to lack originality, we are using the above title for an editorial in this magazine for the second time in ten years. The first one (by D.G.K. in *PD*, vol. 2, no. 2) was written in 1949 on the occasion of the initiation of the Academy's postwar building program, which included the Alexander F. Morrison Planetarium and Hall of Astronomy, the May Treat Morrison Auditorium, the Lovell White Hall of Man and Nature, an addition to the Simson African Hall, and various laboratories and shops. This one is written on the occasion of the groundbreaking for the John Ward Mailliard, Jr., Memorial Library and the Alice Eastwood Hall of Botany, which took place with simple but appropriate ceremonies on the morning of August 19, 1958.

The current undertaking is in a sense a continuation and completion of the earlier project. A library and a hall of botany were included in the preliminary planning in 1949; but they would have added several hundred thousands of dollars to what was already a million dollar program, and the funds were not then available. The need for these facilities was, however, never forgotten, and continuous efforts were put forth to bring them into being. The many friends of Alice Eastwood, the Academy's distinguished Curator of Botany who had recently retired after more than half-a-century of service, contributed generously to a hall of botany to bear her name. And Ward Mailliard, then chairman of the Academy's Board of Trustees, was indefatigable in his efforts to raise funds both for a hall of botany and a library.

We have referred above to the Academy's "postwar building program," a phrase which perhaps requires some explanation. There is no implication that the Academy suffered any particular damage from the war—only that the building program that had been projected for 1942 or 1943, and for which certain funds were already available, had to be postponed to a more propitious time. The war did, however, entail a certain train of events no one could have foreseen.

The Academy had a small instrument shop, developed and presided over by Dr. G. Dallas Hanna, for servicing microscopes and manufacturing special research equipment as needed by the various departments. Wartime needs rendered this shop and its personnel of immense value to the Armed Forces, and the Academy suddenly found itself with a Navy contract for instrument work to the amount of a quarter of a million dollars—and a shop about as big as a bathroom, with one full-time instrument maker and some part-time help.

Part of the public exhibit space in the museum was walled off, additional personnel were trained, necessary machine tools were supplied by the Mare Island Navy Yard, and the Academy manufactured ten thousand optical parts and repaired or rebuilt twenty-five thousand optical, meteorological, or navigation instruments. The end of the war found the Academy with a well-equipped instrument shop and an exceptionally well-trained and experienced group of workers.

In the meantime the Academy's building program, temporarily quiescent, had expanded. Various useful and ambitious projects had been included, one of them the Alexander F. Morrison Planetarium. To that date all of the major planetaria in this country—or, for that matter, in the world—had been built by the Carl Zeiss optical works in Jena, Germany. A letter to the New York office of Zeiss brought back the discouraging report that the war had disrupted their activities, and that they could not supply a Zeiss planetarium in the foreseeable future.

As it turned out, this was an overly pessimistic outlook. The Zeiss plant was quickly reestablished in a new location in Bavaria, and could have supplied a star projector by approximately the time it was needed. But the Academy's decision had to be made in 1947. Substantial funds had been offered from the May Treat Morrison Trust Estate which, if not used promptly, would be withdrawn. We had either to go ahead with the planetarium project or abandon the dream. With no Zeiss instrument available or in sight, the only alternative was to build our own.

This seemed a brash undertaking. But by a curious turn of the wheels of fate, the same war that made it impossible for Zeiss to supply us with a star projector made it possible for us to build one. The crew that had worked in the Academy's shop on lenses, prisms, rangefinders, submarine periscopes and miscellaneous electronic equipment, had developed the ingenuity and skill necessary to construct this extremely complicated instrument, which duplicates the movements of the sun, the moon, the five visible planets, and all the fixed stars that can be seen by the naked eye; and which has built into it astronomical cycles that in nature take as much as 13,000 years to complete.

Many there were who said it couldn't be done, including some of the leading planetarium people in this country. The staff of a large eastern planetarium stated that they did not know how their Zeiss instrument worked, and if it broke down they would not know how to fix it! Among the few who said, "It can be done," were Dr. G. Dallas Hanna and the present writer. Almost their only

supporters among scientists in a position to judge were Dr. Clarence H. Clemminshaw, now director of the Griffith Observatory and Planetarium in Los Angeles, and the late Dr. Russell Porter, long associated with the designing and construction of the 200-inch telescope at Palomar Mountain.

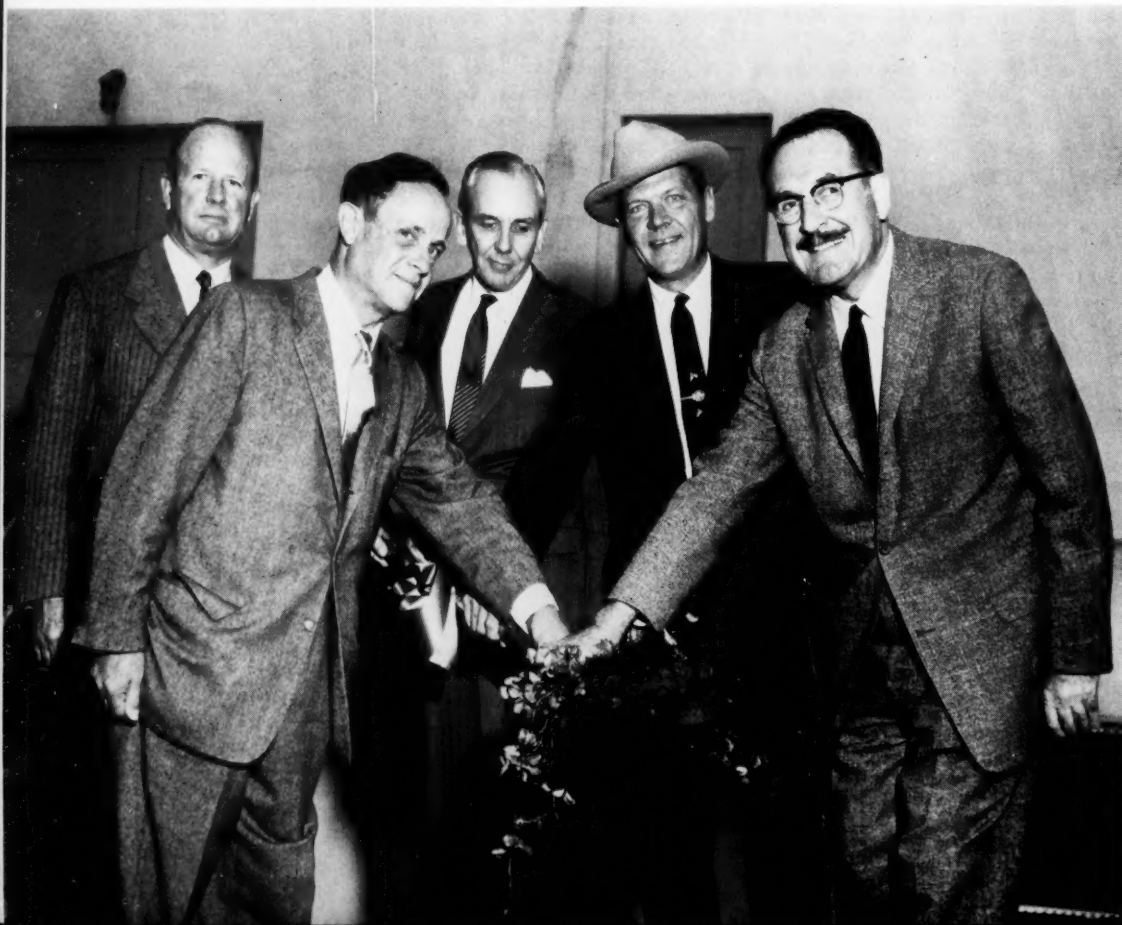
Dr. Porter, by invitation, spent two weeks in the Academy's shop, going over plans, discussing details of design and operation, and then reported to the Trustees that he was convinced the Academy could build a star projector as good as the Zeiss in every respect—"and," he added with his quiet smile, "possibly better." After that the plans for the Morrison Planetarium moved forward without further delay to their well-known successful denouement.

The present undertaking is a happy and fitting sequel to the earlier one, which it supplements in a very vital way. Completion of the new structure, which the contractors have promised in 180 days, will place the Academy in the best position in its 105-year history to carry out its dual mission of scientific research and public education. The Mailliard Library will provide suitable and beautiful housing for the most important scientific library in the San Francisco metropolitan area, with provision for many years of future growth. The East-

wood Hall of Botany will provide exhibit space for public education in botanical science, together with laboratory and herbarium space for the Academy's present collection of some 400,000 herbarium specimens, and many thousands more to be added. The new building will also contain a pleasant and well-appointed meeting room for the Botany Club and other similar gatherings, to be named in honor of the late Norman Banks Livermore, a trustee of the Academy from 1929 to 1953, and president of the Board from 1938 to 1946. Mr. Livermore was deeply interested in the Department of Botany, and the Academy's research program as a whole; through his insistence over the years that the Academy should publish a magazine of popular science, he was practically the founder of *Pacific Discovery*.

There is deep regret in the hearts of all who knew them that Alice Eastwood, Ward Mailliard, and Norman Livermore could not have lived to realize the fulfillment of their dreams. But it is one of the glories of the human race to be able to plan undertakings that outlive the planner, and benefit generations to come. As was beautifully written by the Seer of Patmos nineteen hundred years ago, "They may rest from their labors, for their deeds follow them."

R.C.M.



Many hands make light work. Hefting the first spadeful of earth at the ground-breaking ceremony for the John Ward Mailliard, Jr., Memorial Library and the Alice Eastwood Hall of Botany are (left to right): Brooks Walker, chairman of the Building Committee; Robert B. Rothschild, Jr., of the contracting firm of Rothschild, Raffin and Weirick, Inc.; Decker G. McAllister, chairman of the Academy's Board of Trustees; J. W. Mailliard, III, vice-chairman of the Board; and Robert C. Miller, Academy director. Background is a wall of the existing Hall of Science, to which the new structure will be added.

The BIG ONE got away

MIST HOVERED over the boat landing. The dock lamps made little soft spheres of light, illuminating hazy outlines of dozens of boats moored near the *Geronimo*. Frank and Boots and I loaded gear onto the deck in the still morning darkness. Piles of heavy Manila line, bundles of netting, and other assorted equipment were stowed. Soon all was in order. Frank went below and shortly the main engine caught life. Boots and I cast off the lines and we slipped out onto the glassy quiet of the harbor channel, just as the dull dawn began to bring the forest of masts around us into focus. I wondered: was it sensible, what we were about to try? The silence of my two friends indicated that they too were beset with some misgivings.

Frank, who had been threading the *Geronimo* between big barnacle-encrusted pilings in the narrow channel, turned, "We've handled a lot of porpoises and even some of them put good cricks in my back—and Ken, I remember that Dall's porpoise that just about beat you silly in the skiff. Think what we are asking for now—there's a lot of difference between a little porpoise and a whale, you know."

We were setting to sea to try to catch a whale, and bring it back to Marineland of the Pacific alive. To be sure, this was our job as we are responsible for catching the sea animals for the huge oceanarium. Frank Brocato is the sagacious skipper of the collecting vessel *Geronimo*, and Boots Calandrino is his assistant. I am the curator and thus responsible for giving our captives a happy home once they are caught, in addition to offering a little muscle power in the collecting operations.

Catching a whale had been a sort of growing dream for all of us. It was now far more than a mere job. Over a year in which we had been plotting our attack since the first conference with our Manager, Bill Monahan, it had become a compulsion, something that had to be tried no matter how much idiocy it seemed to involve.

Our quarry was to be a pilot whale. This species is one of the smaller whales and belongs to the same group as the killer whale and the dolphins and porpoises. Female pilot whales grow to about 15 feet, males to about 20 feet in length. A big male will probably weigh 2 to 2½ tons.

The next step was not one ordinarily associated with stories of high adventure—I went to the library. Dusty tomes were consulted and scientific

journals scoured for tips on catching, transporting, and keeping whales.

I found that the *Odontoceti*, or toothed whales, had been kept in captivity a few times before. The longest captivity record was held by Herman, a baby Atlantic pilot whale which lived nine months at Marine Studios in Florida. Herman had been taken from the beach where he and his herd had stranded in one of those inexplicable mass suicides which plague pilot whales. Finally he was killed in a bloody battle by the bottlenose dolphins which shared his tank.

The only baleen whale to reach confinement seems to have been a Minke or little piked whale which became entangled in a fisherman's nets off the coast of Japan. The fisherman laboriously took the creature to the aquarium where it was placed in an outdoor pen. The creature endured captivity for more than a month, apparently without eating. It finally broke through the netting barrier and swam to freedom.

No one, as far as I could find, had ever set out to sea possessed with the idea of catching a live, healthy whale and placing it in captivity. Furthermore, scientific journals held virtually no information outside of taxonomic description regarding the Pacific pilot whale.

Our course was clear. We would have to go to sea for as long as necessary and meet our whale on its home grounds. There we would watch and study him. We would learn his habits and somewhere, somehow, he would reveal his "Achilles heel" to us.

So we had put to sea, armed largely with our compulsion to come to grips with a whale about which we knew very little. I, for one, thought now and then of what might happen if we did actually find ourselves with a ton or so of frantic whale on the line. Frank and Boots said nothing to indicate that they too wondered what might happen; however, the infinite care with which they coiled the lines and continually checked each part of the apparatus made it clear that this was no routine collecting venture for them.

The sun rose clear of the far-away mountains, lighting the distant roofs and factory stacks along the shore. The gray dawn sea became clear and blue. A long glassy swell swept ponderously in, down the San Pedro Channel. Hours later we rounded the tip of Santa Catalina Island and entered the whaling grounds. Boots scurried up

**A-whaling
they would go
—to bring one
back alive!**

Kenneth S. Norris



the Jacob's ladder and clung to the swaying mast-head, peering out over the crisp winter sea. Soon we found a large group of whales, lolling on the calm surface. Their distinct spouts had been visible more than a mile away. The big animals became wary as we approached and sounded long before we could get close. This was the pattern for many days. The whales stayed near the island feeding upon the numberless squids which were spawning on the sea bottom. Try as we did, we could not get close enough to entangle the whales in our net.

Laboriously we began to learn the habits of the pilot whale. The species is always gregarious, gathering in pods of 10 to 50 or more. We began to recognize three different kinds of groups. First, there were the fast-moving traveling groups. In these aggregations the animals usually spread out into a single ragged rank, and all animals kept rigid station with each other. A disturbance at one end of such a school would often cause most of the group to sound for 3 or 4 minutes. Feeding schools were much more loosely tied together. Sometimes we looked down into the blue water and could see whales chasing squid 30 or 40 feet beneath the boat.

The third type of group was what we termed a "loafing group." These were roughly circular pods of 10 to 25 animals, lying about on the surface as if their last care had vanished. Once Frank and I rowed our skiff slowly toward one of these groups

and were able to get within a few yards without disturbing the whales. We boated the oars when one big male thrust his body 4 or 5 feet out of the water and stood there, bolt upright with his pectoral flippers at the water's edge. He slowly turned his grotesque, bulbous head and peered at us. Two others did the same thing. These whales looked for all the world like big shiny brown stumps as they stood there in the water. After four or five seconds they slipped back into the water again and ignored us.

Others in the school sculled slowly along on their backs, with their chins and flipper tips out of water. One even turned its head downward and thrust about 6 feet of its slender tailstock out of water. It maintained this strange position, with flukes waving gently, for a few seconds, and then flopped back into the sea. We gained the impression that these animals had finished catching their daily meal of squid and were taking life easy, inventing games to play among themselves.

We sat silent, listening to the whales "talk." The variety of noises coming from this loafing group was amazing. There were staccato popping noises, little bird-like chirps, high-pitched piercing whistles and once we heard a sort of contralto siren-like wail. It seems possible that these noises are used for communication, much as has been shown for the smaller porpoises and dolphins. Some of the very high frequency sounds may serve as "sonar" signals, which the big creatures

The whale surfaced only a few feet out of our reach.
(Marineland of the Pacific photos by the author)

use to detect objects without seeing them. Some other cetaceans are supposed to be equipped this way. All these sounds are the more amazing when one realizes that whales and porpoises do not use vocal chords to produce them but make the noises by forcing air between the chambers of their breathing canal or from the lips of their blowholes.

After our success in getting close to the loafing groups we spent several fruitless, maddening days sneaking up on the relaxed creatures with nets. Time after time, we crept up on the heedless animals only to have them turn a wary eye on us, slap their tail flukes on the water's surface, and sound into the depths. Repeatedly our tension mounted to a peak and then lapsed into helpless frustration. The final blow came when Frank sat in the skiff repairing his gear near a loafing group. A sharp thump nearly threw him to the deck. On board the *Geronimo* we had seen a big whale sculling along the surface, toward the skiff. The usually inevitable dive did not come and 15 feet of whale rammed into the stern of the little craft. Frank steadied himself, looked over the side at

the disappearing form of the whale and vented his pentup frustration at the sea and all whaledom with soundless gestures far more expressive than any whale language.

Almost a month passed. We had refueled and reprovisioned three times and were on our way in for the fourth time. As we rounded the tip of the island we came upon a small school of pilot whales, one of them carrying a peculiar whitish object on its snout. In a moment we could see it clearly—the white and lifeless body of a baby pilot whale. The adult held the little body by one of its flippers and carried it down with each dive. The big animal's head was worn white where the body had rubbed against it.

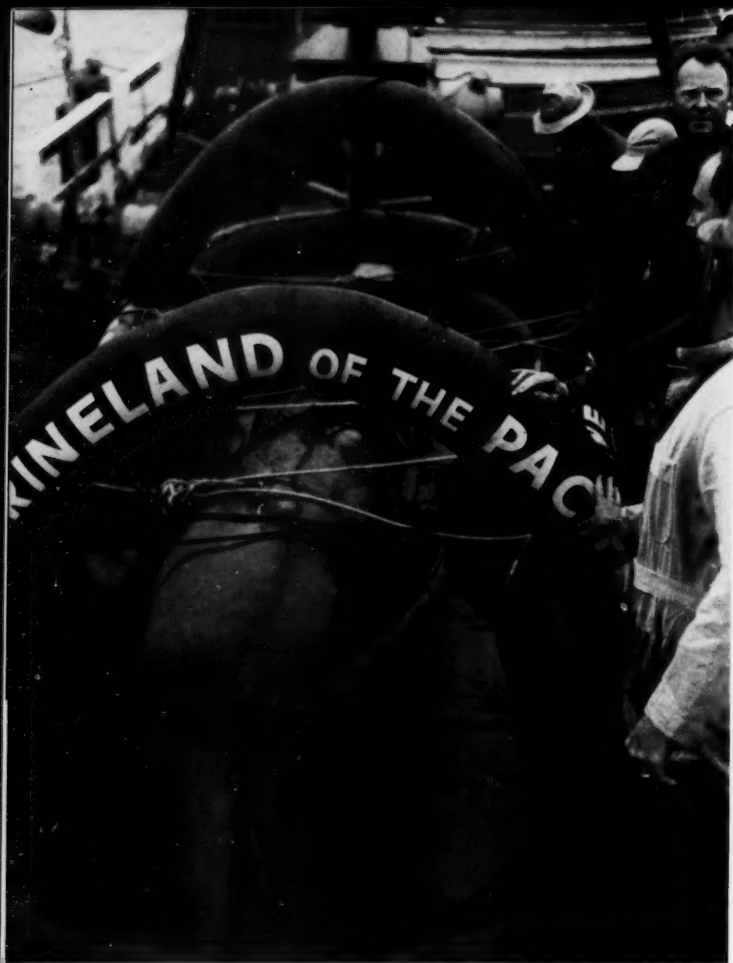
I thought as I looked at that almost unbelievable sight that here was an animal whose habits were still virtually a complete mystery to us and which would have little trouble in eluding our attempts at capture.

Again we put into port, refueled, reprovisioned, and set out to sea. As we left the dock I said a few words of hope for this attempt, which I did not really feel.

My sally was met without a word. Both men were looking ahead at the breakwater. White plumes of spray rocketed 50 feet into the air

In less than a minute the whale was drydocked
and lines rigged for the weary tow homeward.





The pilot whale lay on her side, puffing, cushioned by the water beneath the raft.

where waves beat upon it from the channel outside.

"Look at that sky," muttered Frank, "the weather's turned against us for sure. You can expect only just so much calm weather in winter, and I guess our supply has run out."

Great gray ground swells swept in from the open sea. The 40-foot vessel began to seem all too small as she rode up those massive, moving water slopes and down into the intervening valleys. All day we bucked a whaleless sea.

The whales were gone from the squid grounds and had disappeared into the trackless Pacific. We began to feel our chance had probably been lost. For a month we had worked among schools of them on a calm oily sea. Now, even if we did chance upon a school, capture would be almost impossible. Such a colossal beast could well tear our gear to tatters with the rough sea's help. Still, with a persistence born of the challenge before us, we beat against the open ocean swell for hours more, but finally futility swept away our hope and

we turned toward the lee of Santa Catalina Island.

Frank looked at me sadly and said, "I sure want to catch a whale, but maybe they're just too smart for us—I don't know."

He turned glumly and looked at the tossing, wind-whipped water.

The end of the island was passed and the brutal sea fell into calm. We relaxed a little and tried to figure what to do next. Any direction but close along the island would take us back into the stormy sea. We finally decided to cruise in the lee, though there was little chance of finding whales, and to make a run for home next morning if the sea outside didn't calm. Probably that would end our adventure, and our year's dream would fade.

"Frank! Frank! Look out on the starboard bow," Boots shouted.

We all crowded along the bridge and soon picked out a lazy school of about thirty whales. Instantly the bleak picture of a moment before faded as we rushed to the chase. Boots was put in charge of the net while Frank maneuvered the boat.

I shouted to Boots that he would have a free case of beer if he hooked onto a whale for us. Mac, an extra crew member, offered to add a carton of cigarettes for Boots if he should succeed.

Boots looked at us suspiciously before answering. He wanted to know what happened if he failed.

With the utmost delicacy, Frank brought the boat up on an 18-foot whale. Boots shot the big net out at the beast—and missed.

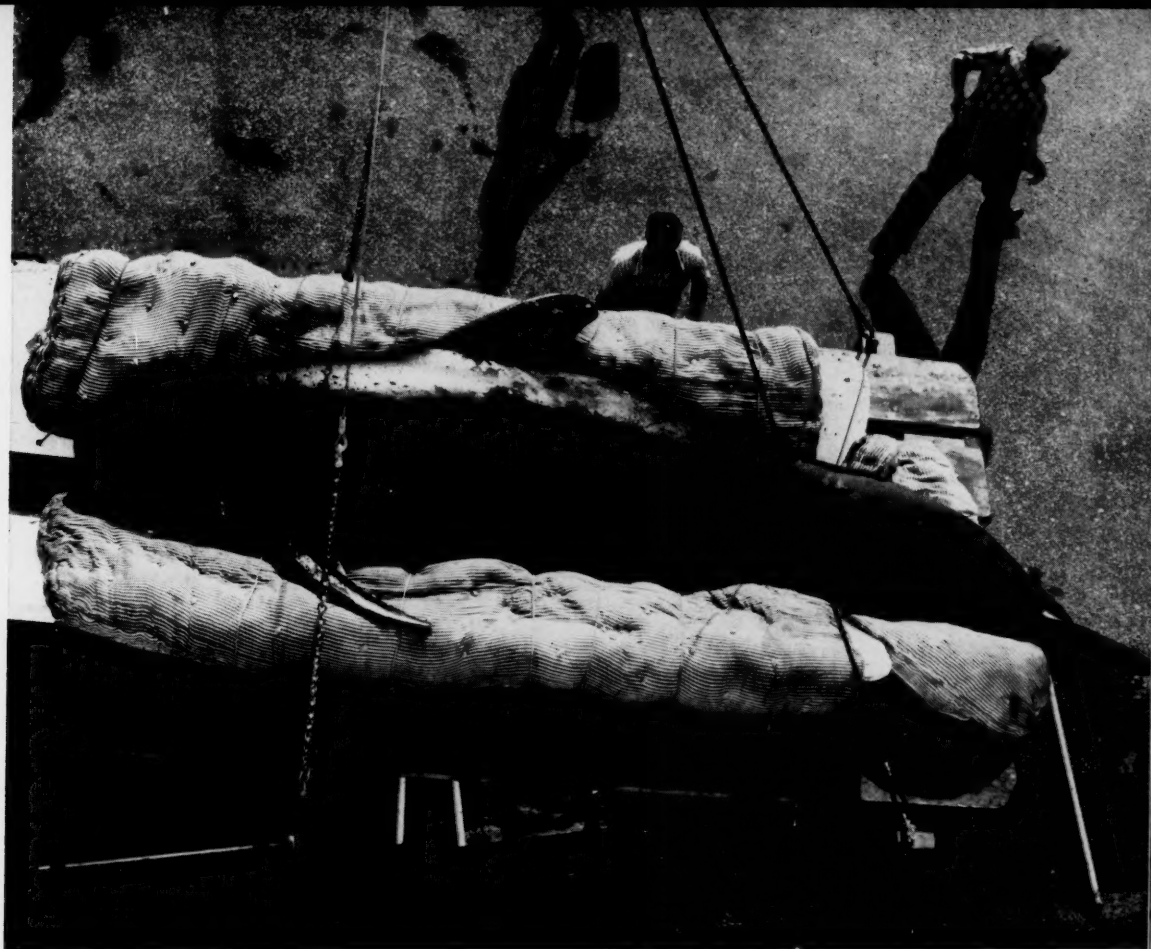
A few minutes later a smaller animal surfaced near us. Frank slipped the boat quietly closer and closer. The animal surfaced again, mere feet out of reach. Boots stood frozen at his post, his eyes glued on the brown form skulking just beneath the surface.

The net flew. In an instant the tailstock of the animal thrashed from the water, throwing spray over the *Geronimo's* bow, and disappeared. The Manila line flew over the side. It payed out in jumping loops over the stern. Frank swarmed down the Jacob's ladder from the flying bridge like a hungry spider. Quickly the line was caught up and turns taken around the bit.

The 1,500-pound animal sounded far down into the deep water. She rushed to the surface four minutes later, vented an explosive breath, and dove again. All of the school swam just in front

➔ Bubbles was hoisted to the big oval tank.

‡ She got a shot of vitamins as we moved her to her new home.



of her, as if urging her on to still greater efforts.

Frank never let her put her weight directly against the line but played her like a game fish, now giving line, now taking it in. For hours the fight continued. Darkness came and we could see the plunging whale no longer. From the bow we could hear the school far ahead of us. From time to time the fighting whale was worked in close to the *Geronimo*. Then we could see the school by their rocket-trails, left in the phosphorescent water.

It was nearly midnight before the whale seemed tired enough to be brought alongside. Protesting to the last, she came into the circle of light cast by the boom light. What a strange looking creature she was! Her long slim tail looked completely out of proportion to her heavy body and bulbous head.

A line was quickly slipped around her tail and pulled tight. Then she lay immobilized on the surface. Several Pacific striped dolphins swam so close around her that we could nearly reach

down and touch them. Her other whale companions refused to enter the circle of light and soon could be heard no more.

We lowered a deflated 20-man rubber raft into the water and spread it on the surface. The frightened whale whistled her apprehension as we slid it beneath her. Two tugs at the trigger lines and carbon dioxide gas rushed in to inflate the raft. In less than a minute the whale was drydocked. Lines were rigged by weary hands for the long tow home. The long fight had carried us about 5 miles closer to home than when the whale was first trapped.

We stopped our labors for a moment and looked

at our captive. Then silently we looked at each other, breathed tired sighs of relief, and tried to realize that we had succeeded.

I said, "Fellows—by golly we have caught a whale."

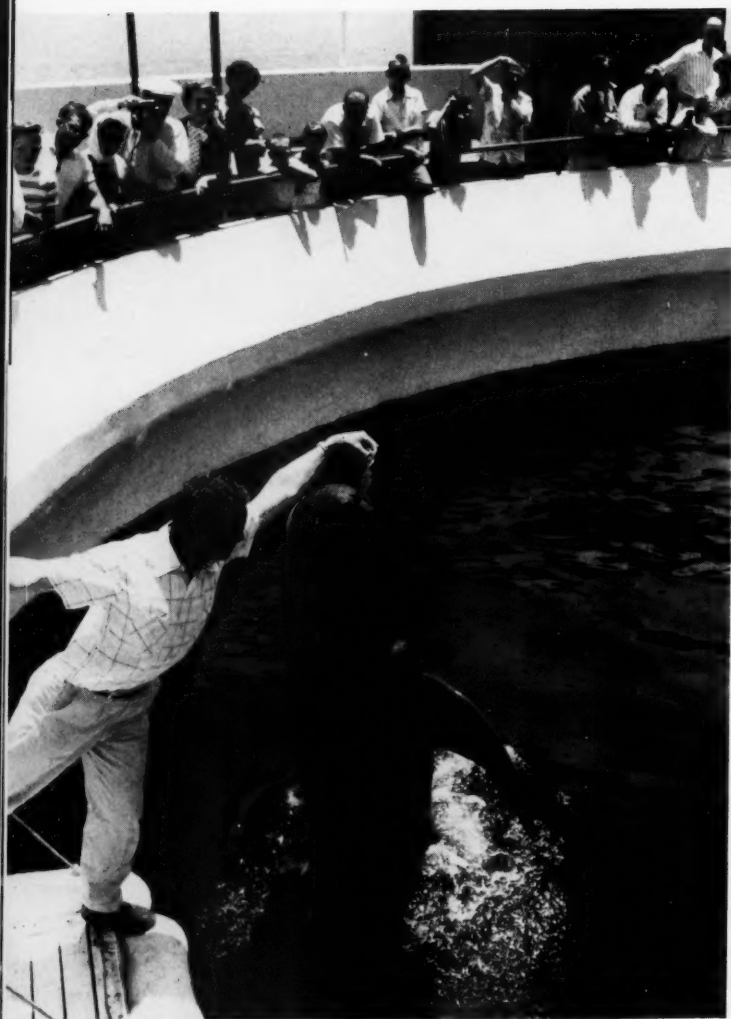
What a strange sound that single sentence had after all the futile weeks at sea! Our symbol of success, pride, and comradeship was to shake hands. Too tired for any other outward emotion, we sprawled on the after deck with cups of hot coffee and looked out at our prize lying in the raft. She lay on her side puffing intermittent breaths, cushioned by the water beneath the rubber bottom of the raft.

Miraculously the sea had calmed. Instead of the heavy seas of the day before, we cruised through calm waters to Marineland. A heavy wooden platform was swung over the side of the pier. Divers stood on it as the raft was brought alongside. The raft was slipped onto the platform and quickly hoisted onto a waiting truck. A few more moments and the whale slipped into her new home in a Marineland training tank.

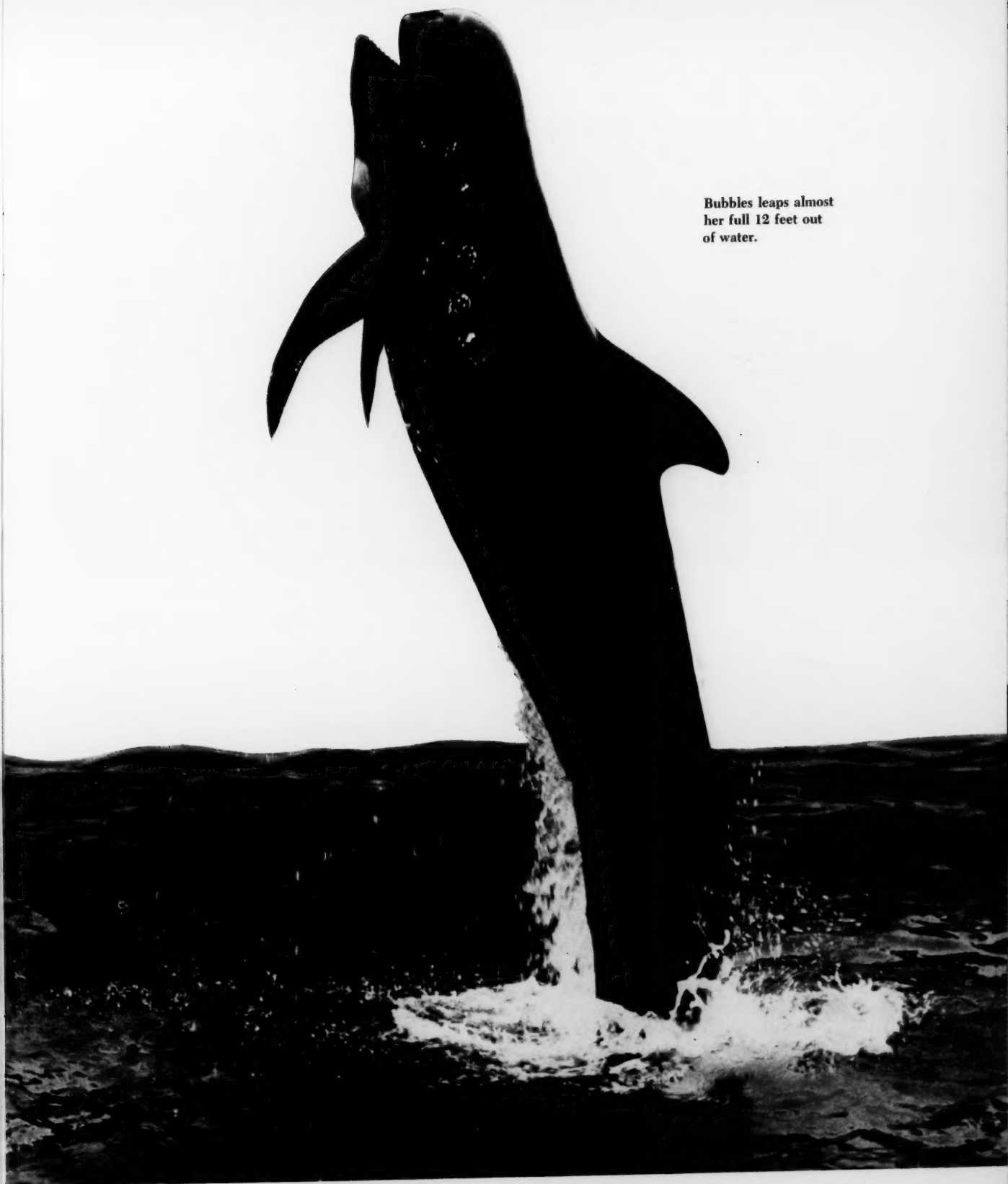
Within three months many things had happened to the little whale. First, she had been christened "Bubbles" by the children who came to Marineland. She had risen to the status of a star attraction, by learning to jump for her daily 70-pound ration of squid. Her trainer found her to be a most apt and gentle pupil for all her awesome size. She quickly learned to clear a hurdle, retrieve a life ring, and to do a dozen other tricks.

Then one morning in June we knew something was wrong. Bubbles refused to eat and she swam listlessly around the big tank with her eyes closed. Everyone at Marineland became alarmed when this hunger strike began to stretch into days. Theories developed everywhere. An inner tube which she retrieved in exchange for squid or anchovies had disappeared. Perhaps she had swallowed it and was suffering from a leviathan tummy-ache. Some thought she was just lonesome. On the thirteenth day everything became clear when Bubbles was found playing with the missing inner tube. It was intact and fully inflated. Aside from being steeped in squid oil it was in perfect shape.

Bubbles moves more thoroughly into the hearts of the staff at Marineland every day. One of these times we will have to go back out to sea to catch the big one that got away, just to keep her company.



Bubbles leaps almost
her full 12 feet out
of water.



ESKIMO HUNTERS

3. BIG GAME ON THE CHUKCHI

RICHARD D. TABER

AS THE SUN SHINES ever more brightly on the sparkling arctic ice, and the Eskimo hunters of Wainwright have finished with whale hunting for another year, the seals begin to crawl out of the water to bask more frequently. The seal hunter puts on his white parka, hitches his dogs to his sled, and glides quietly away.

The sea ice is far from being flat. It is thrown into miniature hills and hollows by the buckling and shifting of the ice under pressure. Silently slipping through the valleys and over the saddles, the hunter stops frequently to take his rifle and creep softly to the crest of a ridge and peer below for seals. When he finds one, he shoots to kill it instantly, because if it is only wounded, it readily slides back into the water. A good hunter may bag ten seals in one June day, each seal a rich store of oil and meat.

Back in the village, the hunter throws down the seals beside his door and goes his way. His wife and daughters process the seals, skinning them,

pegging the skin out on the ground to dry, putting the blubber in vessels to be rendered by the sun and slicing the meat to dry. All over the village are old pots and buckets full of the yellow blubber which lies just under the skin of the seal and protects him from the chill of the frigid sea. Gradually the oil separates out of the blubber — oil which is still highly regarded by the Eskimos and seems to appear at every meal, much as butter does in other societies.

If the seal meat is not cut into strips to dry, it may be put into the cold cellar to freeze. Since the ground is permanently frozen a few inches below the surface, anyone may have a home freezer for the digging. The Eskimos sink a shaft into the ground, put a ladder down one side and a door at the top and the job is done, never to need repairs. It is mostly the village dogs which profit by the cellar — in the aggregate, they probably eat more meat than the villagers do.

There has been an interesting development,

since ancient times, with respect to the Eskimos' dogs. In the past a hunter had one or two, seldom as many as four. This meant that he had to help push and pull his sled along much of the time. But now the teams have grown to eight or ten dogs and the hunter rides. There is no doubt that a dog sled is still the most reliable form of transportation for short distances during the ten months of the year when there is snow and ice. The sled never runs out of gas, and if there is no meat for the dogs today they will keep going until they get meat tomorrow.

Dog teams like automobiles are now, however, more than mere transportation. If a three-dog team equals a Model T, then a ten-dog team equals a Jaguar and every young hunter looks forward to having a handsome dog team. When he has the dogs, of course, he has to feed them. If he is too busy on some construction job to hunt, he may even feed them on commercial dog-food, imported from the States.

Dogs, except for puppies, are by law tied up when not in use and they seem to devote their spare time to perfecting a penetrating howling dirge, in solo or chorus. In general, the dogs of Wainwright get good care. This reflects the relative wealth of their masters; the sea in front and the land behind support them and there is money to buy with when the hunting is poor.

Sometime in July, ordinarily, the sea ice breaks up under the force of a southerly wind. This breakup begins much earlier far south on the lower fringe of the frozen sea and slowly works north. At any time during the breakup the southern edge of the remaining ice is marked by a zone of floating cakes. This zone is the haunt of the walrus, which dives to the bottom of the sea to feed and rises to crawl out on a floating ice island to bask and be carried ever northward.

The walrus herd passes one coastal village after another in its northward progression. From each of the villages, the white boats with their white-clad crews of hunters glide over the misty waters, while the hunters listen for the noises of the herd. They quietly probe for passages through the shattered ice, passing iceberg after iceberg, each with its blue fissures and its pea-green skirt where the

water laps up around it. At last the living forms loom up, scattered at their ease upon the ice, and the boat, with only the slightest movement of the paddles, slowly glides into range — the walrus hunt is on.

In 1956, the ice broke up so suddenly there was no walrus hunt. The herd passed the village too rapidly to be located. The hunters turned to the bearded seal, or ugrook.

This seal is useful, as all marine mammals are, for meat and blubber, but its special value is in its hide which is used for the construction of boats. These are framed with wood and covered with skin and no other skin can compare with the bearded seal's for this purpose. The hides are sewn together with a waterproof stitch over the frame and painted, usually blue or white. Boats are rated for size by the number of skins required to cover them — you have a seven-skin boat or a nine-skin boat. From time to time the boats must be hauled out of the water for drying or the skins will become loose. After a few years the hides wear out, so the hunt for the bearded seal goes on.

At this season, the last icebergs go sailing north before the wind, and the surf begins to break on the shore of the shallow sea — a strange sound



after the quiet of the ice. In rough water, the seals are hard to see so they are generally hunted in the calm, glassy shallows protected by the ground ice which is still anchored to the bottom.

▲ A bearded seal, just shot and harpooned, is hauled out on the ice spurting blood.

11



With no special precautions the hunter lands on the edge of the ice and sits scanning the water, with his rifle ready. From time to time a head appears to the south, sinks from sight, reappears and sinks again, each time further north. When a shiny black head appears within range, the hunter fires. If his shot is good, the seal will flounder on the surface for a period before sinking. During those few moments, the seal must be harpooned or it will sink and be lost. There is a mad dash for the boat after the shot, the outboard motor catches, and the boat surges out over the still water with the harpooner poised in the bow.

Bearded seals are said to float for a time, at this season, because they are so fat; the more common hair seal, thinner now, will sink.

Later in the short summer, another movement signifies that another hunt will shortly begin. Herds of caribou winter back in the foothills of the Brooks Range. As snows melt, air warms, and insects swarm, there is a movement of the caribou downward toward the coast. The cows with their calves and yearlings hang back in the foothills, but the bulls move on, some reaching the coast by mid-July. A few of these are killed for meat as they are encountered but the real hunt takes place in the fall.

In August the new winter coat of the yearling caribou has grown to about an inch in length. This is the signal for the start of the fall hunt for skins and meat. Boats start up the rivers, to penetrate into the hills as far as possible, looking for the herds of cows and young. At this season the animals are in good condition and the hides, especially those of the yearlings, are at their best for clothing. There is a limit to what a boat can carry, and this controls to some extent the annual kill.

There was a time when the caribou herds which roam the Arctic Slope were much reduced, and even locally extinct, under the hunting pressure of a large population of Eskimos and white whalers, all armed with rifles. There seemed to be such a lot of space with no caribou, the idea arose 30 or 40 years ago of introducing reindeer to support the Eskimos. Eventually this was done. The Eskimos became reindeer herders for the federal herds.

For a time the reindeer flourished, but in the years just prior to World War II, something seemed to go amiss. As long as there was no other work there were plenty of herders, but with the

increase in activity early in the war many found new jobs. Moreover, the reindeer were not doing as well as in earlier years. Whether their range was too heavily grazed, or the new systems of herding were ineffective, or the wolves suddenly appeared from Canada, are questions that can be answered only after careful study. The fact remains, however, that during the war the reindeer herds melted away, and the caribou reappeared. At present, the caribou are said to be more numerous every year. Like the reindeer they provide food and skins, but unlike the reindeer they take care of themselves and do not require lonely herders to camp for days away from the social delights of the village.

In late August or September the short autumn ends and winter comes again. Early winter is the traditional trapping time and formerly the dogsleds went out over the snow for many miles, establishing lines of traps for white fox, red fox, and wolverine. But fur prices have gone so low and other employment has become so much more profitable, much less trapping is done now. Recently there has been an upsurge of interest in long furs, such as fox, for women's clothing. If this raises the value of the fur, more Eskimos will trap, but various synthetic furs have been competing so successfully with true furs, the heyday of the trapper may never return.

There are still polar bears. Just as the pursuit of whales marks the Eskimo of substance, the hunt for bears is the sport of brave young men. The polar bear, white in the dusky white world of winter, fierce and powerful, makes life more interesting in Wainwright. Just as the mountains in the States have a special life while the grizzly bear is still roaming the forests, the ice fields tingle with the presence of polar bears.

Out on their sleds in the wilderness of the frozen sea, keeping on course by the feel of the wind on their cheeks, the hunters look for fresh tracks. Finding the tracks and following them, the hunters loose their dogs which soon bring the bear to bay. While his ancestors used a thick-shafted spear for the final encounter with the bear, the young hunter now favors a heavy revolver, which leaves one hand free to hold back the dogs.

The Eskimos have great respect for the polar bears and they tell many stories about their strength and agility. When approaching a polar bear, they say, you must avoid its left side, because all bears are left-handed, and much quicker with

the left paw than with the right. When a bear waits at a seal's blowhole and the seal's head appears as it comes up to breathe, it is the bear's left paw, the Eskimos say, which flicks out and hooks the seal up onto the ice like a cork out of a bottle.

One night, when the author was in an eider camp and the rain and winds had driven the hunters into the tent, the talk turned again to bears. Out of the talk came two fascinating stories which may have been based upon actual observation or made up on the spur of the moment to pass the time.

Fast as they are when running on top of the ice, so one of the stories goes, polar bears are also fast when running *under* it. Plunging under an ice floe, they turn on their backs and digging their claws into the lower face of the ice, they gallop along upside down in the water, much faster than they can swim.

When harassed, the polar bears take to the water under the ice as their natural refuge. On one occasion, another story relates, some hunters were chasing a bear with dogs. When hard pressed the bear suddenly stopped, and rearing up on his haunches, hit the ice a mighty blow with his forepaws. Nothing happened, but the bear reached out and raked back through the ice, twice. A shower of chips flew out each time. Another blow of the forepaws broke the ice and the bear dived in to live another day.

These stories may be compounded of tea and tobacco smoke but one recent winter a polar bear truly came too close for comfort. In the midst of the winter gloom, the dogs of Wainwright began to bark. As one Eskimo put out his head to see what the furor was all about the light from his house shone full upon a polar bear. Jumping back into his living room, the Eskimo began a frantic

search among his possessions for his rifle. By the time he located it, the bear was gone.

It didn't go far, however. By the glimmer of noon its tracks could be seen between the houses, which stand well apart. Again at night, the bear was glimpsed and lost. People stayed indoors, afraid to meet a huge white bear in the shadowy white landscape of winter Wainwright.

On the third night the dogs began to bark again and this time the hunter was ready with his rifle and flashlight to shine in the bear's eyes. He made his kill and as he stood happily over it, in the bedlam of barking dogs and shouting neighbors, something different reached his ear. It was the voice of the hunter's wife. But instead of adding her congratulations to the din, she was taking him to task for killing the bear when she might have taken the rifle and done it herself — the bear was in the front yard and so convenient — and become the only woman in the whole history of Wainwright ever to kill a polar bear.

Even by the lonely shore of the Chukchi Sea, the old order passes.



↑ The hunter's work ends at the front door, where his womenfolk take over with their semicircular knives, cutting the caribou into strips for drying.

← The main caribou hunt takes place in the fall when the meat and the hides are at their best.





far

THE PAST AND THE PRESENT:

✻ east

STONE/ BRONZE/ AND FLESH—

faces

ASIA'S TIMELESS VISAGE



through the editorial lens of

DON GREAME KELLEY

Seen from the West, the Far East has always worn a face of mystery—enigmatic, alluring, sometimes repelling, always intriguing, and speaking to us of unhurried time.

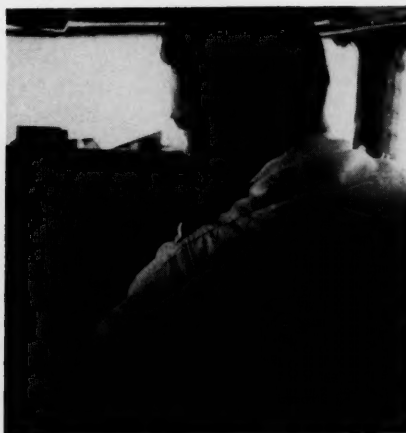
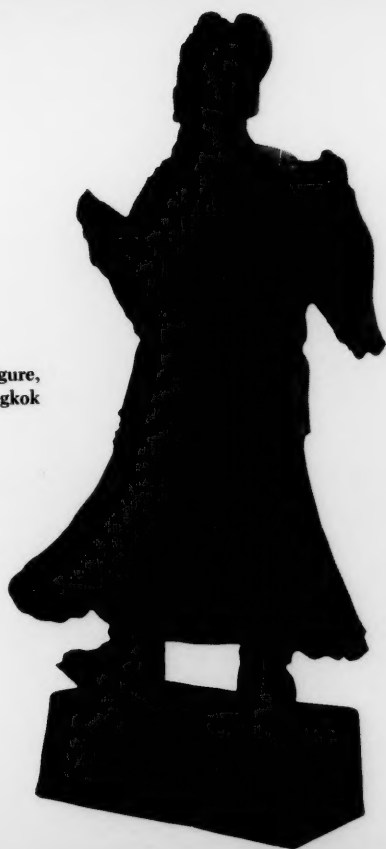
Often the Orient has faced us in the flesh—numerously in our urban “Chinatowns,” one or a few at a time behind laundry and lunch counters in remotest villages, or on college campuses. It has met us in bronze and stone in museums and art shops and from halftone pages in books and magazines. So we have built a mental picture of the East, a picture of many faces.

Going there, if I was prepared for anything it was for the multiplicity of Far East faces—for the sheer overwhelming abundance of them, both the living and the imaged; streets teeming with the present; muted temples guarded by grotesque figures; treasure houses such as the National Museum in Bangkok where the four-armed “Shiva” and the placid Buddha invited me into the mystic past. . . .



The faces that—even before I left home—beckoned me most compellingly into the Asian past were those of Angkor where the present is of the jungle and only the past can speak of man's capacity for sublime creation. . . .

Temple figure,
Bangkok



But the faces that welcomed and guided me on the westward journey to the East were those of Japan—and of the present—friendly and competent faces of airline pilots and hostesses.



... the face of Japan

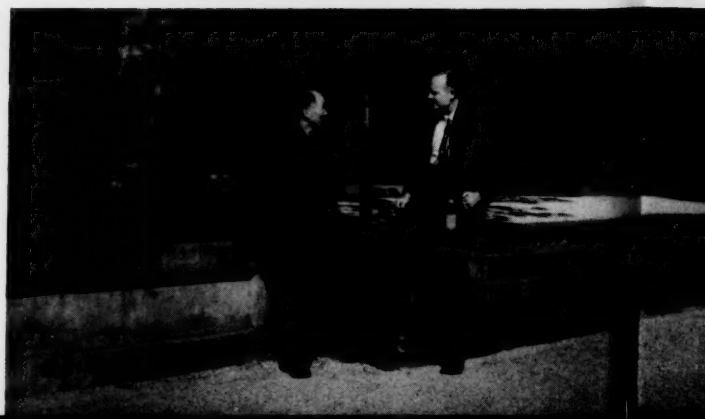
The face of Japan first smiled expressly for me on the person of Dr. Takashi Ino, of the Tokai Regional Fisheries Laboratory, who drove down from Tokyo to meet me at Yokohama, and became my faithful friend and guide through ten crowded days when I first took up the role of roving observer. Ino-san led me through Tokyo's huge and lively fish market, and put me on the train to the northern city, Sendai.

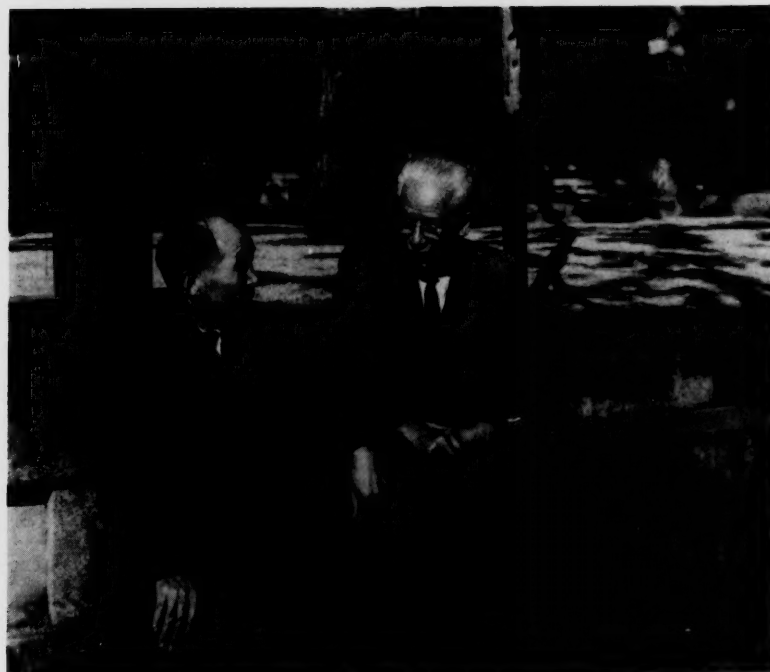
Taking the boat to Matsushima, I found people enjoying an excursion just as people do anywhere.

16



In ancient Kyoto, two kindly professors met my train and gave me the delightful hospitality of a Japanese inn after an evening tour which included tea ceremony, geisha dances, and Buddhist temples.





My kind hosts
in Kyoto: Professor
Denzaburo Miyadi,
Director of the Seto
Marine Biological
Laboratory; and
Dr. Yoshiichi Matsui,
Director of the
Nippon Institute for
Scientific Research
on Pearls; both of
the faculty of
Kyoto University.





One of Hong Kong's faces—the long one—gave me, in brief passage, some insight into Asia's number one problem: food. Here under the great market shed at Aberdeen, Hong Kong's main fishing port, one sees no gayety on the faces of the black-clad Chinese women sorting fish. There is not enough to go around, and the population swells daily.

the face of Thailand



The hundreds of wats—temples—made Bangkok look like a forest of giant potato mashers. Close up, the detail often resembled wedding cake decoration encrusted with sequins—actually, bits of colored glass. Against the background of static, crystalline architecture the motley face of humanity moved in a mingling of many ways of life. Most conspicuous of these, by virtue of the brilliant yellow-orange robe, was the way of the Buddhist novice in his many hundreds. In early morning the brethren are seen going in some promising direction with empty rice bowl. To feed one confers some grace upon the giver, of course. Lavish wats and bright robes are symbolic of Thailand's taking its national religion seriously but not somberly. The Thai man in the street accepts a life of limited outlook but does it quite cheerfully, it always seemed to us Ninth Pacific Science Congress delegates.

of
nd

Village life flows
in and out of the city
by means of a widespread
network of canals—*klongs*.
So it is not strange that
this village suppertime
scene beside a klong
many miles out of Bangkok
can be duplicated on many
a street corner within
the capital itself.
The Thai are past masters
of the art Californians
consider their own—
the ancient art of
indoor-outdoor living!

Four smiling coeds on the campus
of Chulalongkorn University, the
last day of the Congress, bespoke
two firm impressions we took away
with us: one, education is highly
prized in Thailand; another, so is
hospitality. The University year
was quite disrupted by the influx
of several hundred foreigners; the
city hotels were taxed beyond their
limits of space; government people,
from highest ministers down to
clerks and drivers, had to cope
with us—language and all—yet
we left with the grateful re-
membrance of cheerful courtesy
and all-out willingness which
are but natural expressions
of the Thai character.



Station platform—southern Thailand.
Much of the Far East seems to be always
patiently waiting—for a meal, a train,
a little space to live in, or just
for life to pass. . . .



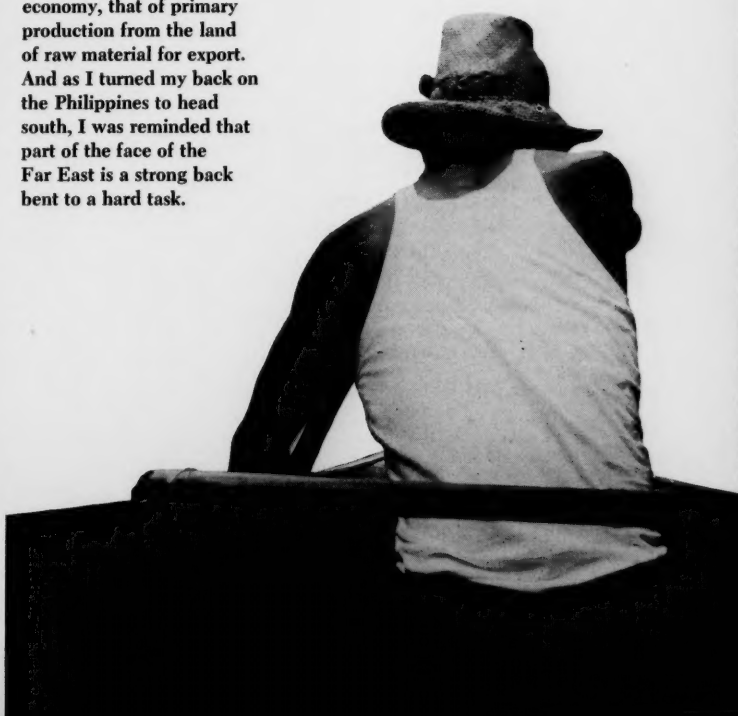
... Philippine faces

The Kalinga gentleman of northern Luzon's Mountain Province, in Sunday best loincloth of exquisite native weaving, and tattoo "upper" which is assuredly an item of everyday wear, is a patriarch in his barrio where his grandchildren and grandnieces and nephews go to school in crisp American-style clothes—the Philippines in transition. And in the neighboring Ifugao country a Late Stone Age father (*below*) seems to accept cheerfully the fact that his children are being educated for a far different life—a better one? Perhaps. . . .





Putting a good face on hard work, these lads of a copra-making barrio in southern Luzon typify a middle stage in island economy, that of primary production from the land of raw material for export. And as I turned my back on the Philippines to head south, I was reminded that part of the face of the Far East is a strong back bent to a hard task.



How deep are those Mexican barrancas?

WELDON F. HEALD

PHOTOGRAPHS BY THE AUTHOR

An objective eye
and a careful study
of contour maps
shows the true size
of some famous
"unmeasured
mysteries of the
hemisphere"

22

IN 1950 the Los Angeles County Museum sponsored an ambitious ornithological expedition to the Barranca del Cobre. In the party were six Americans, two Mexican guides, seven mule drivers, and a twenty-seven burro pack train. They followed rough and arduous mountain trails in from the old mining town of Alamos, to the west, and their trials and adventures were many. At one time they reported: "After ten days of struggle against thirst, fatigue, illness, and scorch-

ing heat, we are at last approaching a point from which our goal—the big canyon—may be reached in one long march."

A member of the expedition was a *Life* staff photographer and the trip was featured in the magazine, with dramatic text and striking black-and-white and color illustrations. "Mexico's Barranca del Cobre, its awesome 'Canyon of Copper,'" the article read, "is a natural wonder in a class with the Grand Canyon of



Vegetation is profuse in the barrancas, varying from mountain pine forests on the rims to tropical growth at the bottom. Hill farms, Indian huts, and cave dwellings dot the steep walls. The Yankee copper-mining town of La Bufa, deep down in the Barranca de Batopilas, is reached by a spectacular corkscrew road.

the Colorado River. It is probably shorter than the Grand Canyon's 280 miles, but it may go down 8,000 feet, 2,000 feet deeper than the U.S. gorge. No one is sure of the dimensions because the Barranca del Cobre, which lies in the Sierra Madre of northwestern Mexico, is one of the unmeasured mysteries of the hemisphere."

This is typical of the vague but provocative reports that have reached civilization from time to time for the past three centuries. Although only 275 miles south of the border, the elusive Mexican canyon has been so remote and difficult to reach that it became an incredible, half-legendary sort of place, inaccessible to most people as the Mountains of the Moon. As a result, the

Barranca del Cobre has inspired more false, second-hand, and hearsay information in recent times than any other geographical feature in North America. Most persistent rumors are that it rivals the Grand Canyon in size, depth, and grandeur; and that even greater barrancas, 9,000 feet deep, lie hidden to the south in the fastnesses of the Sierra Madre Occidental. Two notable barrancas among these are the Quebrada de Huyapan and the Quebrada de San Gregorio. The first is more than forty miles long and reaches a maximum depth of 5,000 feet or more; the latter is smaller and in no place do the enclosing walls rise much higher than 4,500 feet. Besides these there are scores of smaller tributary canyons. In fact, the west slope of the Sierra is riddled with them. But none approaches the dimensions of the gorge of the Urique nor rivals it in majesty. The Barranca del Cobre is preëminent in grandeur, but U.S. Air Force charts bring to light a couple of gorges far to the south that appear to be deepest of all. They are the barrancas of the Río Piaxtla and Río del Presidio, which are located on the border of the states of Sinaloa and Durango. Flanking the north and south sides of Cerro Huehueto, 10,335 feet elevation, these rivers have excavated profound chasms from 6,000 to 7,500 feet deep.

Little by little fact is supplanting fiction. In the eight years since the Los Angeles County Museum's expedition, conditions have radically changed with respect to the "Canyon of Copper." Mexico's mystery gorge has suddenly emerged from its age-long obscurity. It can now be reached from the east fairly easily by truck, carryall, or four-wheel-drive vehicle, and the number of visitors is rapidly increasing each year. Furthermore, regularly scheduled conducted tours of the region were recently organized. My own trip was made with two companions in a Jeep station wagon, and we drove directly to the north rim and crossed the upper part of the barranca on a fair mining road. In fact, it was hard to believe that only a few years before this had been a fabulous, almost unknown land—one of the last such remaining on the continent.

We found the country to be a fascinating area of vast pine forests, magnificent canyons, primitive Indians still living in caves, and ancient missions antedating the famed California chain by a century and a half. Stretching southward from the New Mexico line, the Sierra Madre Occidental is a link in the almost continuous cordillera which borders the Pacific from Bering Sea to Cape Horn. More than 750 miles long, it varies from fifty to seventy-five miles in width, and rises to summits over 11,000 feet above sea level. Relatively young as mountains go, the entire massif is built up mostly of intrusive and eruptive volcanic rocks of the Tertiary period. The eastern slope is long and gradual, but on the west it drops in a sudden precipitous escarpment to the tropical lowlands of the Pacific coast.





Barranca de Basihuari, a tributary to the Cobre, where many of the 50,000 Tarahumara Indians have their little farms and cave dwellings.

➤ **MAP NOTE:** Our drawing is based on the WAC charts mentioned in the text. Not all places mentioned here are shown on them, and other sources disagree. Our map is for illustration only, not field use!

The Sierra is actually more of a broad highland country, averaging 7,500 to 9,000 feet elevation, than it is a mountain range. Summit valleys are shallow and rounded contours characterize the peaks and ridges. However, the west-flowing rivers have cut back from the Pacific-facing escarpment and gouged out tremendous barrancas which break the undulating surface of the uplands like a series of giant trenches, and exhibit some of the sheerest up-and-down topography on the continent. So the Sierra presents a combination of gentle beauty and savage grandeur, a sort of scenic parallel to the Biblical lion and lamb. It resembles no other range I know and refutes that unimaginative statement many people make: "All mountains look alike."

Even yet, though, the Mexican Sierra is still largely unsurveyed, and few parts have been explored by competent observers. Also such maps as exist are small-scale and lacking in details. Best to date are the World Aeronautical Charts of the United States Air Force. They are plotted from aerial photographs and have a standard scale of 1:1,000,000, or approximately 10 miles to 1.25 inches. Main points, stream courses, peaks, lakes, and towns are accurately laid down. There are also contour lines, with intervals of 2,000 feet in the mountainous sections, but these are sketched in from the photographs and fixed points, so necessarily involve considerable guesswork. The Air Force charts, of course, are primarily for flyers, not earth-bound travelers, but they do give us, at last, enough information to dispel some of the obscuring mists of fantasy.

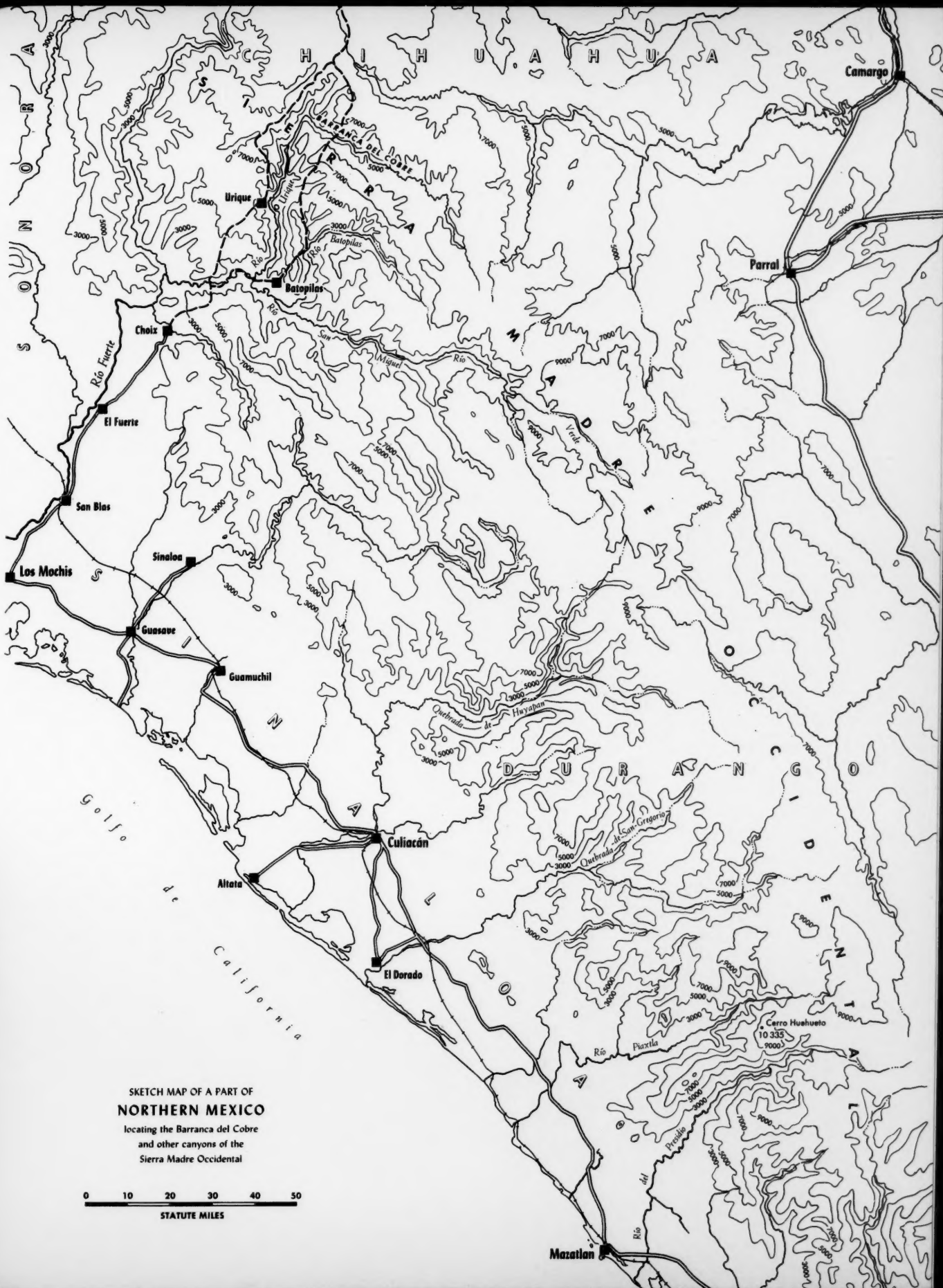
No. 521, the *Lake Santiaguillo* quadrangle, first issued in 1947, includes the Barranca del Cobre. It

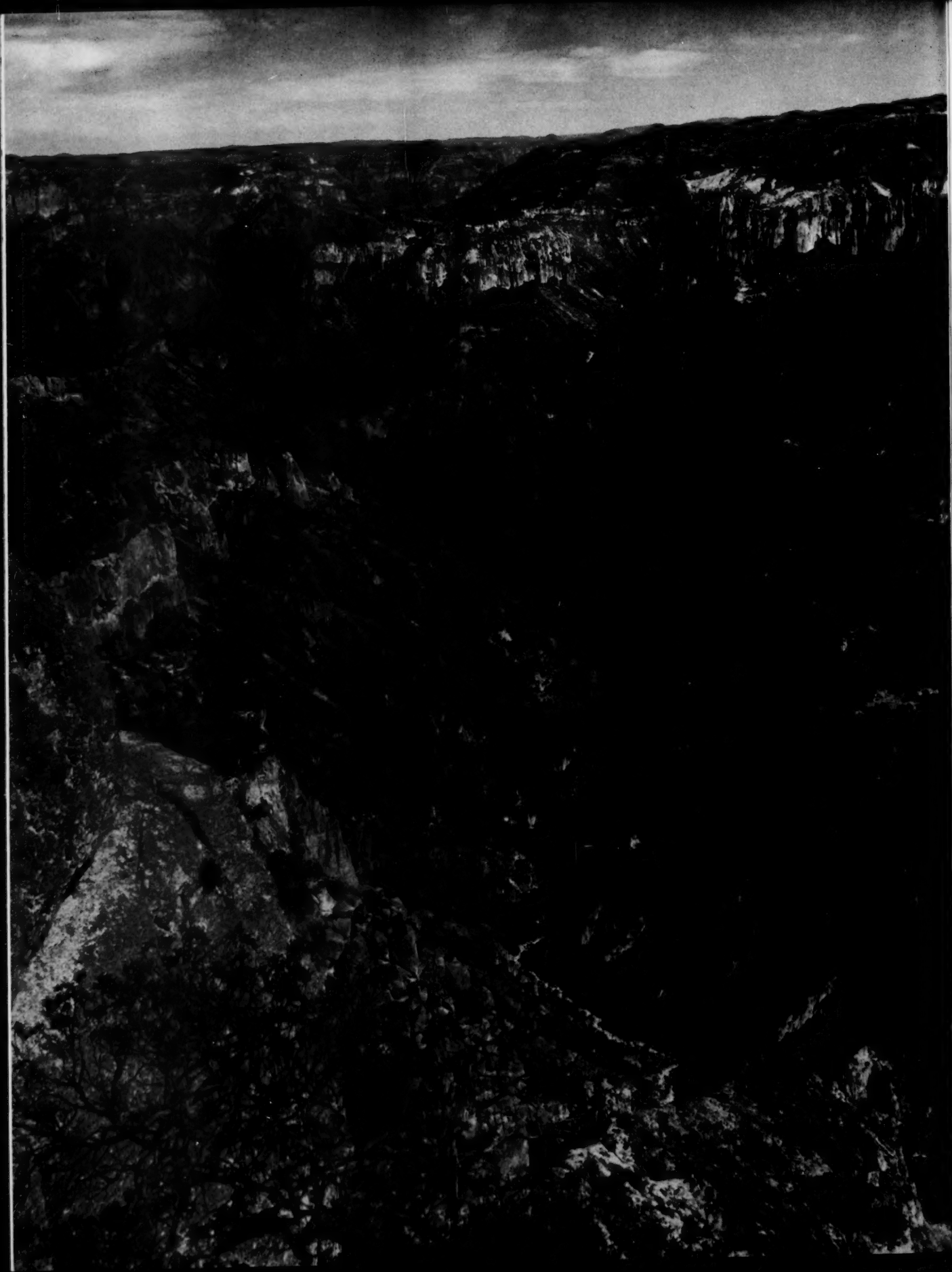
West-flowing rivers cut the highlands of Mexico's Sierra Madre Occidental into some of the sheerest up-and-down topography in North America.

Indian trails can be seen crisscrossing the steep slopes and leading to caves and high-perched farms.



mentioned
em, and
eld use!





shows that the Río Fuerte has three upper tributaries which penetrate the Sierra Madre Occidental like the tines of a pitchfork. These streams rise on the continental divide and have excavated a trio of roughly parallel trough-like canyons that become progressively deeper until the western escarpment is reached. There the three rivers escape from the mountains and join to form the Río Fuerte, which flows across the coastal plain in a southwesterly direction to the Gulf of California.

Northernmost is the Río Urique, master sculptor of the greatest canyon. With a course of about 120 miles, the river with all its windings probably has a total length of less than 200 miles. It first trends northwest, then makes a sharp dog's-leg just beyond the half-way point, at Divisadero, and finally goes almost due south to the Fuerte, at the base of the mountains. Although the Urique has cut a continuous gorge into the heart of the Sierra, different parts have local names, but it is now usual to refer to the whole as the Barranca del Cobre.

According to the map, the canyon of the Urique is ninety miles long, varies from four to eleven miles wide, and reaches an extreme depth of about 5,000 feet, or a little more, in its lowest section. The 3,000-foot contour line intersects the river just below the big bend and our altimeter recorded Divisadero, on the north rim, as 7,350 feet elevation, with the Mesa de Barranca, 1.5 miles southwest, 350 feet higher. This is probably approximately correct, as our altitude for Divisadero exactly checks with a railroad survey made in the 1940's. But an allowance of 200 feet either way might be made for the contour line. This means that undoubtedly the lowest section of the barranca, below the great bend, surpasses a depth of 5,000 feet.

These figures compare favorably with the south rim of the Grand Canyon. There, the benchmark at Bright Angel Lodge is 4,430 feet above the Colorado, and only one point near Diamond Creek reaches a height of 5,000 feet. But from here on statistical returns pile up a commanding lead for the Grand Canyon. Together with the contiguous Marble Canyon, it is more than three times as long and has a maximum width of eighteen miles. Furthermore, the North Rim averages a thousand feet higher than the South and at one point attains a height of 6,100 feet.

There are also great differences between the Colorado and the Urique. Whereas the former is a mature and mighty, silt-laden continental river, the latter is a steep-pitched, sometimes torrential, local stream. The Colorado has managed to maintain its grade as a vast plateau rose across its path, while the Urique has carved out a huge canyon in its descent from summit to base of a single mountain range.

These two gorges affect one with a similar sense of silence and immensity. But the barranca doesn't quite equal the overpowering, smashing bigness of the

Grand Canyon nor match its brilliant coloring and architectonic buttes and temples. On the other hand, there are many features that make the Chihuahua chasm distinctive in its own right. The gray-brown volcanic cliffs and ridges are intricately eroded into fluted columns, towers, and pinnacles. Vegetation is much more profuse than at the Grand Canyon, and varies from mountain pine forests on the rims to tropical growth at the bottom. Unique, too, are the signs of human life. This part of the Sierra is inhabited by some 50,000 Tarahumara Indians, one of the most isolated and primitive tribes in North America and among the world's few remaining semi-nomadic cave dwellers.* Their trails crisscross the plunging slopes and lead down to eerie cave homes and precariously perched farms, and here and there cornfields appear like postage stamps glued to the precipitous walls. Thus the Barranca del Cobre, unlike the Grand Canyon, does not belong to the realm of geology alone, but tempers its austerity with a friendly welcome to plants, animals, and men.

Some twenty miles south is the second river, the Batopilas. It also flows in a southwesterly direction, then swings in a great curve to the south and joins Río Fuerte a few miles west of the Urique. The Batopilas is a shorter river and its canyon is neither so deep nor long as the Barranca del Cobre. However, there is one particularly spectacular narrow section, enclosed by rocky precipices rising to heights of 4,500 feet. Clinging to the steep slopes, deep down in the canyon, is the Yankee copper-mining town of La Bufa, reached by a sensational 85-mile road from the north. The corkscrew descent into the Barranca de Batopilas is the most breathtaking piece of highway engineering I have seen anywhere.

The third river, another twenty miles south, is the San Miguel and its upper continuation, the Verde. Although the Barranca de San Carlos, on the latter, is reputed to be 6,000 feet deep, no such high relief is shown on the map—1,500 to 2,000 feet less would be a better guess. Carl Lumholtz, the Norwegian explorer and ethnologist, spent considerable time in the 1890's among the fish-eating Indians in this barranca, and his photographs indicate a sinuous, extremely rugged gorge, with steep cliffs and sharp-pointed peaks soaring directly above the river.

Unquestionably within a few years the Barranca del Cobre will be a world-renowned tourist objective. Indicative of the coming invasion is an enthusiastic project to make the gorge of the Urique and surrounding area a great national park. But when one can drive over a paved highway to a luxurious lodge on the rim, the last haunting shred of mystery will be torn from the giant, hidden canyon in the Sierra Madre Occidental.

* See "Land of the Little People" by Martin Litton, *PD*, November-December, 1954.—Ed.

GALILEO GALILEI

Messenger of Stars

GALILEO GALILEI was born in Pisa, Italy on February 15, 1564, the year of Shakespeare's birth and Michelangelo's death. Kepler, the German astronomer, was his contemporary. His life spans the period in the Americas from the landing of the Huguenots in Florida to the founding of Harvard College in Massachusetts. He died in Arcetri, near Florence in 1642, the same year Isaac Newton was born.

Galileo's place in history is not to be found just by his juxtaposition with his contemporaries; his significance is that he insisted upon the importance of *observation* and *experiment* in science.

Galileo came from a Florentine family of noble background. His father, Vincenzio Galilei, was a cloth merchant and also an accomplished musician and composer. Notwithstanding the family's meager funds, young Galileo was sent to the University of Pisa to study medicine. While at the University his interest turned to mathematics and scientific investigations. One story relates that he discovered the law of the pendulum while observing the swing of a great bronze lamp in the Cathedral at Pisa and timing the oscillations with his pulse.

At the age of twenty-five he was appointed to the staff at the same university, and it was while there that he performed the famous leaning tower demonstration. Most of the scholars of his day were content to discuss physical phenomena by way of logical argument rather than actual investigation. For example, it was assumed that heavy objects fall faster than light ones. Galileo, so tradition says, climbed to the top of the 183-foot Campanile in Pisa and dropped two unequal weights thereby proving *by experiment* that his colleagues' reasoning was in error. He proceeded to investigate the motion of freely falling bodies and formulated mathematical expressions for such motions.

Galileo was a popularizer of science. He wanted to share the thrills of his discoveries with the man in the street, so he preferred to write about his findings in the Florentine dialect rather than Latin which was the official language of the universities and little used by the average person.

Feelings were aroused by his unorthodox methods and teachings, and finally Galileo resigned his position at the age of twenty-eight. He accepted the post of Professor of Mathematics at the University of Padua, near Venice. The next eighteen years were among the happiest of his life. While at Padua two daughters and a son were born to the Galileis.



In 1609 Galileo, now forty-five, received word that a telescope had been constructed in Holland by a Dutch lensmaker. Immediately Galileo set about to figure out the principle of the telescope himself. By careful investigation into the laws of refraction he finally arrived at the solution. After a few preliminary models, which were comparable in magnifying power to present day opera glasses, he finally succeeded in constructing an instrument that magnified more than thirty diameters. Galileo then turned his "optic tube" toward the heavens.

In March, 1610 Galileo published his first telescopic observations in a small book entitled *The Starry Messenger*. The first printing of 500 copies quickly sold, and more had to be printed. Kepler had a second edition printed in Germany. Within five years *The Starry Messenger* was translated into Chinese and published in Peking.

In the book he describes how he found the moon rough and uneven—in contradiction to the prevalent idea that it was perfectly smooth. His maps show the mountains and craters. By measuring the lengths of shadows cast by mountains on the moon he was able to calculate their heights with results that are in favorable agreement with modern determinations.

Next, the planet Venus was found to exhibit phases similar to the moon. This substantiated his belief in the Copernican Theory: viz., that the earth and planets revolve around the sun.

Jupiter was found to possess four satellites. With this discovery he upset the numerological beliefs, held

Horizon breakers

Discoveries and Opinions of Galileo. Translated with Introductions and Notes by Stillman Drake. Doubleday & Co., Inc., New York. 1957. 302 pp., Appendices, and Index. 26 line drawings. \$1.25 (Anchor edition).

This book accomplishes what the title implies. The author has selected four works of Galileo; has put them in modern English; and prefaces each with introductory remarks setting the background for each translation.

Today, when science and technology surrounds us everywhere, it is refreshing to look back across the centuries and witness the breakthrough that Galileo made upon the prejudiced horizons of his day. Through these printed pages one feels that he is right there with Galileo as he first turns his telescope toward the moon. The reader experiences excitement as this great Italian scientist discovers the "four planets" of Jupiter and the phases of Venus.

Mr. Drake has admirably achieved the goal that he out-

by many, that there were a fixed number of moving objects in the heavens.

He expressed himself as follows when he looked at the Milky Way: "Upon whatever part of it you direct the telescope, straightway a vast crowd of stars presents itself to view; many of them are tolerably large and extremely bright, but the number of small ones is quite beyond determination. . . ." (Translated by Edward Stafford Carlos [1880]).

The pressing duties of teaching robbed him of the time he wanted to devote to scientific observation. Besides he had a nostalgia for Florence, his early home. So finally in June 1610 he resigned his position at Padua to return to Florence where he became the Chief Mathematician and Philosopher to the Grand Duke. This new position relieved him of his teaching duties and gave him more time to continue his scientific pursuits.

A set of new telescopic observations were published in 1612 under the title: *Letters on Sunspots*. This work also contains a description of Saturn as it appeared in his telescope. The telescope was not sufficiently powerful to clearly reveal the true nature of Saturn's rings. Galileo's drawings of Saturn show it to be touched by two small spheres—one on each side. The rings were not clearly seen until forty-four years later when a Dutch mathematician, Christian Huyghens, saw them with a better telescope.

Although naked-eye sunspots had been seen from time to time by observing the sun through clouds, it was generally assumed that they were Mercury and Venus passing in front of the solar disk. Galileo made many drawings of sunspots with the aid of his telescope. From his observations he surmised that they were contiguous with the sun's surface and was thus able to determine the sun's rotational period by clocking their drift across the solar disk.

History sees Galileo as a man who was not content with the narrow view of his day. With a love for truth and a passion for freedom of the scientific method he pulled aside the curtains of the celestial stage and revealed the great scenery of the cosmos. C.F.H.

lines in the opening of the preface to the book: "... to present in substantially Galileo's own words both the astronomical discoveries that made him famous and the philosophical opinions that cost him his freedom." C.F.H.

How to make a Telescope. By Jean Texereau. Translated and adapted from the French by Allen Strickler. Interscience Publishers, Inc., New York. 1957. 208 pp., 86 illustrations, 7 tables. \$3.50.

When the original French version of this book was published, Albert Ingalls, the well-known author and editor of the American classic, *Amateur Telescope Making* said: "... if translated into English it would make a splash in amateur telescope making circles. . . ."

Now that the English edition has come off the press the reviewer can well agree with Mr. Ingalls' prediction. It is clear that the translator was thoroughly familiar with technological French.

Professionals and amateurs alike will find this book an excellent guide to telescope construction—from mirror to

SKY DIARY

September, October, 1958

(Pacific STANDARD Time used throughout)

Phases of the Moon

☾ Last Quarter	September 6	2:24 A.M.
☾ New Moon	13	4:02 A.M.
☾ First Quarter	19	7:17 P.M.
☾ Full Moon	27	1:43 P.M.
☾ Last Quarter	October 5	5:20 P.M.
☾ New Moon	12	12:52 P.M.
☾ First Quarter	19	6:07 A.M.
☾ Full Moon	27	7:41 A.M.

Meteor Showers

October 20-21—**Orionids**: maximum about 20 per hour on that night, with duration of 10 days around it. Look above Eastern horizon after midnight.

Eclipses

October 12—**Total Eclipse of Sun**. NOT visible from the United States. Path through South Pacific and Chili. (10:20 a.m. to 3:30 p.m.)

Occultation by moon

October 19—**Beta Capricornus**, (mag. +3.1); the following times for San Francisco:

Time of Immersion (moon covering star): 9:11 P.M.

Time of Emersion (moon uncovering star): 10:24 P.M. Look above southern horizon.

The Planets

Mercury: Greatest western elongation Sept. 9 (mag. 0.0). Well placed for observation above the eastern horizon before sunrise. Passes close to Regulus on the morning of Sept. 10; near Venus on the morning of Sept. 18. During October it will be too close to the sun for observation, being in Superior Conjunction Oct. 5.

Venus: Visible in the morning sky (mag. —3.3) rising about an hour before the sun. Near Regulus on Sept. 9. Too near the sun during October for observation.

Earth: Autumn begins on Sept. 23 at 5:10 A.M.

Mars: In Taurus (mag. —0.8) rising about 9 P.M. during the middle of September. Begins retrograde motion, i.e. moves westward among the stars, on Oct. 9. By the end of October will be rising about an hour after sunset.

Jupiter: Low above the south-west horizon at sunset (mag. —1.5) during September (in Virgo, east of Spica). In close conjunction with the moon on September 15 at 10:37 P.M. During October will be too close to the sun for observation.

Saturn: In quadrature (90° east of the sun) on Sept. 12. Above the southern horizon and east of Antares, setting before midnight. By mid October will be setting around 9 P.M. (mag. +0.8)

mounting. Jean Texereau, the author, started as an amateur and is now Engineer of the Optical Laboratory of the Paris Observatory. He is also President of the Instrument Group of the Astronomical Society of France.

With this book at his side the serious beginner can follow the step by step instructions and make a fine telescope. An excellent chapter on photography with the amateur telescope concludes the book.

How to Make a Telescope is a must for all who have caught the telescope making bug. C.F.H.

From ant-hill to Everest

Hunting with the Camera. By Allan D. Cruickshank, Editor, Charles E. Mohr, Edward S. Ross, Herman W. Kitchen, Rutherford Platt. Harper & Brothers, New York. 1957. xi + 215 pp., 41 photos, frontispiece in full color. \$4.50.

We are in a heyday of nature photography. Equipment is at hand and techniques are known which make possible as never before the intensive recording on film of every aspect of the natural world. To encourage this active approach to nature is to broaden the appreciation of its beauty and its intricate mechanism; to promote conservation; to further science; and to give untold satisfaction both to the doer and to the viewer.

In this attractive book five well known professional wildlife photographers—scientists in their fields—share with all who aspire to take worthwhile pictures the knowledge they have gained through long experience. They write simply and clearly of technical matters, and fill us with the fascination of wild living things as they take us afield with the camera. Cruickshank's subjects are birds and mammals; Mohr's are amphibians and reptiles; Ross, our California Academy of Sciences curator, is the insect hunter (just returned from a year of shooting "small game" in Africa); Kitchen's is the wondrous world of seashore, tidepool, and underwater life; Platt shows us that even trees and grasses, mushrooms and mosses, seaweeds and flowers can be exciting "game" for the camera hunter. There is a book to get you out of your armchair, and the beauty of it is, you needn't go beyond your own backyard ant-hill to get into action.

I Take Pictures for Adventure. By Tom Stobart. Doubleday & Company, Inc., Garden City, New York. 1958. 288 pp., 68 photos. \$4.95.

If you did not know that Tob Stobart was the camera-man who documented *The Conquest of Everest*, in the film so named, you might judge from the pulp-magazine title of this book that here was the somewhat hoked-up exploits of a sort of muscle man among photographers. If the title doesn't stop you, a treat is in store—that is, if you like your adventurers to think, feel, react to what they see and experience as intelligent and even sensitive persons, and to write commensurately well, besides. Such an adventurer and writer is Tom Stobart, who quite frankly took up photography as a passport to faraway places.

Such far places as the northwestern Himalaya, the Antarctic, Africa, and Australia gave Tom the expedition and camera experience to qualify him for the crowning assignment—the Everest story. One thing perhaps that makes his account of the successful venture especially good is the fact that he, as photographer, could view persons and events from off center and thus with perspective not given those in the heart of it. And because he was not writing the book of the conquest of Everest, he could—and did—write, unclouded by heroics or glamor,

what may be the most clearly honest account in print. At least, he does here what indeed he does throughout his book: he puts in the telling little things—the sweat, the toothache, the rock-in-the-shoe, the dirt and boredom and swearing—that are as much a part of great things done on the fringes of the earth by, after all, ordinary men as the more heroic aspects extolled in the press. In sum, Stobart has written a completely believable book, as well as one filled with wonder at the world.

Colonial office please note

Return to the Islands: Life and Legend in the Gilberts. By Sir Arthur Grimble. William Morrow & Company, New York. 1957. vi + 215 pp., line drawings and sketch map. \$4.50.

This is a book I read and started a review of before my recent trip to the Far East and Southwest Pacific. My trip did not change the feelings I had about the trueness and charm of the book and what must be the qualities of its writer. The only thing I can add now is that, granted the world had to go through the phase marked (or marred) by the institution known as colonialism, it would be reaping a far sparser crop of problems today had more men of the temper of Arthur Grimble found their way into the world's various colonial administrations. Which is a round-about way of saying: If "natives" anywhere must be "administered," give us more of this kind of man to do the job. One may feel sure it is the few Arthur Grimbles in her colonial service that have enabled Britain to work relatively painlessly out of the domination phase and into the "partnership" phase in regard to her colonies.

Sir Arthur's career bridged the two phases, and his Epilogue here is a clear-sighted tract for the future—for whatever future remains to the colonial relationship which, we are justified in thinking, Sir Arthur retired hoping would progress gracefully toward its logical conclusion. But *Return to the Islands* is not a treatise on colonial administration. It is, rather, a treat for the armchair observer of life on mid-Pacific islands, as seen and lived through several decades by an Englishman endowed with humanity, humility, and humor.

Blood on the snow

Wilderness Men. By Howard O'Hagan. Doubleday & Company, Inc., Garden City, New York. 1958. 263 pp. \$3.95.

The Northwest seems to be a land in which mysteries have lodged—mysteries of nature and of men. It seems a sombre and a haunted and a heartbreaking land, a land of hunters and hunted, of stalking and trapping and killing, of blood on the snow. This is not meant to be poetic mood—this is the mood O'Hagan's book leaves you in. It is not recommended for bedtime reading. It is not recommended to the delicate or blood-shy. The ten stories are given us true, and Howard O'Hagan knew some of the men who lived them—"Old" MacNamara of the wolverine, and Jan van Empel, and Montana Pete. One of his "heroes," the exploring botanist David Douglas, "the grass man" and walker among trees," belongs to the history of natural history in the Pacific Northwest, though his bloody end occurred ironically in warm Hawaii. Perhaps most intriguing of them—his is a remarkable mystery tale even though the reader is in on it early—is Grey Owl, who is also a little-known hero of conservation. And the most incredibly survival-fit is undoubtedly "the man who walked naked across Montana"—John Colter's feat would be hard to top, in the Northwest, the Southwest, or anywhere else. For sheer hackle-raising horror, we give you

Tzouhalem, a very bad Indian indeed, although the white "man who chose to die" is guaranteed to keep your goose-pimples standing on edge—right to the end.

What's in a Nome?

Names on the Land: A Historical Account of Place-Naming in the United States. By George R. Stewart. Houghton Mifflin Company, Boston; The Riverside Press, Cambridge. 1958. xv + 511 pp., illustrated. \$6.00.

Having won in 12 years the status of a classic, Professor Stewart's *Names on the Land* was bound to be reissued in due time. Statehood for Alaska made the time due, although the decision to reissue the book was made, so the author says in his "Foreword to the revised and enlarged edition," in 1956. The Foreword, incidentally, is a pleasant addition to the book, the author telling why this is his own favorite among his many titles, and giving us a glimpse of the correspondence the original edition has brought to his box over the years. It should be as gratifying to all who will continue to cherish the 1945 edition, as it was to the author, that when he "re-read the book critically" he "found little to change." Indeed, the original plates have been used, with a few line corrections.

Both old and new readers might well turn at once to the added chapters on Alaska and Hawaii. Some interesting differences appear. While Hawaii abounds in Polynesian nomenclature—even the Sandwich failed to go down—Alaska carries few names that could be called Alaskan. The Russians did a poor job of sticking names on their American land, although their first, Cape St. Elias (1741) is still on the map. "Only with the voyage of the great Captain James Cook in 1778 did the naming of the mainland coast really begin." After him, Vancouver, Beechey, Franklin; and after 1867 our Coast and Geodetic Survey was Alaska's chief namer, especially in the redoubtable person of George Davidson (who was one of the great presidents of the California Academy of Sciences, be it also noted). Davidson's account of the naming of Nome is "a highly curious story," one not to be spoiled by springing it in review.

Captain Cook also had a lead part with respect to Hawaiian names, but to opposite effect. Great hands at naming things, the Polynesians had done well by Hawaii, and the ethical Cook respectfully recorded what he heard. It is to the missionaries' credit that they did not destroy the native names along with the culture. It remained for a commercial enterprise to desecrate the Islands with so hideous an incongruity as Spreckelsville. This reviewer would close his remarks about a unique and rewarding book by suggesting that the same beneficiaries of Hawaii's fruitful soil and climate might reward the Territory upon her ultimate statehood by initiating a change to something euphoniously native.

The Notes and References, and Index, give *Names on the Land* added hold on its place as one of the few available reference works on American place names. D.G.K.

Quack doctor?

A Paddling of Ducks. By Dillon Ripley. Harcourt, Brace and Company, New York. 1957. 256 pp. \$6.00.

One of the more demanding hobbies in this world is collecting ducks and geese — live ones, that is. Dillon Ripley, well known ornithologist at Yale University, is by avocation an inveterate collector of waterfowl. This book is an intimate account of his successes and his defeats, his joys and his sorrows, in assembling and keeping a representative collection of ducks and geese of the world at his pond near Litchfield, Connecticut.

The story is well told and thoroughly entertaining, even for those of us that do not aspire to duck-keeping. Without being anthropomorphic, the author gives personalities to his birds so that the reader develops a certain association with them as individuals or as species. There are adventures in seeking rare varieties in India, the South Seas, northern Europe, and Africa. There are poignant moments when ducklings perish for lack of the right food or a broody foster-parent. And there are gross tragedies caused by hurricane, flood, or by predators getting through the protective fence.

The effect, in all, is to create substantial interest in this singular hobby and respect for those who pursue it. A.S.L.

For knowing mammals

Palmer's Fieldbook of Mammals. By Dr. E. Laurence Palmer. E. P. Dutton & Co., Inc., New York. 1957. 316 pp., 300+ drawings. \$3.75.

Dr. Palmer is professor emeritus of nature, science and conservation education at Cornell University. In such capacity, he could be expected to know his mammals well. This volume in the Dutton Nature Fieldbook series proves the author's knowledge of mammals is entirely up to expectations.

In all, 300 mammals, representing every order of mammals in the world, are included in the book. About each mammal, Dr. Palmer's description includes range and distribution, habitats, physical characteristics, ways of life, classification, anatomy, reproduction, economy, food needs, ecology and genetic relationships: in short, all the information that either a mammalogist can refer to or an interested layman can learn from. The book is not a large one since it is designed to be carried into the field. Because Dr. Palmer includes mammals from all parts of the world, it was necessary for him to get a great deal of information in a rather limited space and still have it remain complete and easily understandable. His success is a tribute to both his knowledge of the mammals and to his organization.

Unfortunately, the drawings of the mammals are another matter. Some of them are attractive and probably many of them are quite accurate but partly because of the limited space, many of them are too small and too crowded for the reader to be sure. In some instances, either the drawing technique or the reproduction process gives little indication of what the mammals pictured really look like. The layman attempting to identify mammals using these drawings will definitely have trouble in many instances. In most cases, however, the completeness of Dr. Palmer's lucid descriptions should fill the gaps. G.B.B.

Guide to Shangri-La

Buddhist Himalaya—Travels and Studies in Quest of the Origins and Nature of Tibetan Religion. By David Snellgrove. Philosophical Library, Inc., New York. 1957. 324 pp., 74 illus. \$10.00.

A scholarly history of how Buddhism came to rise and fall in India and Nepal and then to take hold in Tibet, which is now the religion's center.

Snellgrove manages a brilliant exposition of the doctrine itself, an exhaustive examination of the ritual observances and literature growing up around the doctrine, with special emphasis on typically Tibetan transformations of these. He also takes a sidelong glance, mostly in the form of photographs, at temples and shrines, painting and sculpture.

The book is fascinating but it is definitely for the reader who already has deep interest and/or knowledge of Buddhism. The casual reader may run into trouble. A.S.R.

academically speaking

ON NOVEMBER 10, William B. Pitts, Honorary Curator of Gem Minerals at the Academy, will be 91, a remarkable enough achievement in itself, but just one of many in his long life.

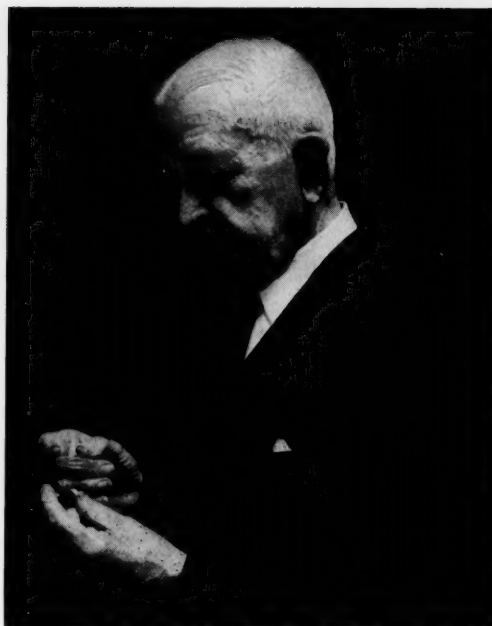
It was 51 years ago that Billy Pitts first became associated with the Academy—a half century in which he has marked up a long and impressive record of accomplishments, although he supposedly “retired” in 1925.

Mr. Pitts first became interested in gem minerals in 1906. Since that time, the volume of minerals he has collected and polished and the esteem in which his work has come to be held have secured his place as the acknowledged dean of American lapidarists.

The Pitts Collection, in its permanent location in the Academy's North American Hall, is one accomplishment for which the lapidarist is especially known. The collection has been called “unquestionably the finest of its kind in the country.”

Many persons—especially if they were already on the retired list—would have been content to let the matter rest there. Not Mr. Pitts. In 1935, he moved his shop to the Academy and since that time, a steady flow of polished gem minerals has come out until the efforts of Mr. Pitts are represented not only by his fine collection at the Academy but by other collections of his handiwork at the Santa Barbara Museum of Natural History; Geology Museum, Emory University; Smithsonian Institution; Chicago Natural History Museum; Cranbrook Institute of Science; Buffalo Society of Natural Sciences; Academy of Natural Sciences of Philadelphia; American Museum of Natural History; Tallahassee Geology Museum and others.

Recognition has, of course, come to Mr. Pitts for his work. He is a Patron of the California Academy of Sciences, and an honorary life member of at least ten mineral



William B. Pitts. (CAS photo by Elmer Moss)

societies. If he had displayed all of his citations and certificates of merit from organizations which exhibit his specimens, he would have had no room left to work.

For many years, Mr. Pitts has spent his springs and summers collecting and working in his shop at the Academy and his autumns and winters in Georgia and Florida. This year he left for the South some six or eight weeks earlier than usual. Just before he left, he said he thought he would stay near his family in Georgia from now on rather than return to the Academy in the spring.

Anyone who knows Mr. Pitts knows he is not giving up his work with gem minerals; his primary reason for deciding to remain in the South is to take care of a favorite nephew who is seriously ill. However, when spring returns to San Francisco next year, it will be very surprising if Mr. Pitts does not return with it.

• • •

A SCIENTIFIC EXPEDITION is, by its very nature, a serious undertaking, but on the theory that the most serious of expeditions must have its moments of lightness, members of the staff of the Alexander F. Morrison Planetarium recently presented Manager George W. Bunton with some of those moments.

Bunton left this month for the Danger Islands in the South Pacific where he is representing the California Academy of Sciences on the expedition to observe and photograph the solar eclipse of October 12. The expedition's headquarters is on Motu Koe, one of the Danger Islands, which lies directly in the path of the eclipse.

Motu Koe is a remote island far across the Pacific and, being uninhabited, is probably rather lonely. The Planetarium staff members presented Manager Bunton with an extremely special custom-made Survival Kit as a going-away gift before he left.

The kit has nothing in common with bona-fide kits of the same name. It includes a host of items which would never find their way into such a kit if survival were the real issue. But, on the other hand, a member of an expedition never knows when he might need: a toy helicopter, a certificate for six hula lessons, a roll of life-savers, one

UNIVERSITY OF CALIFORNIA EXTENSION

presents

The third lecture series on
Land and Life of California

“FLORA AND FAUNA”

★ *In San Francisco* at the Extension Center, 55 Laguna St., beginning September 23 at 8 p.m.

★ *In Berkeley* in room 155 Dwinelle Hall, U.C. campus, beginning September 25 at 8 p.m.

NINE WEEKLY LECTURES . . .

Birds of Hillside and Garden in the Bay Area • Migratory Water Birds • Insects • Common Night-Feeding Animals • Life Between the Tides • Pine Forests of the West Coast • Cacti and Other Succulents • Wild Flowers • Mammals of California

ALL FOR \$10 (students \$5)

To enroll, call any Extension office or write Department of Conferences, University Extension, University of California, Berkeley 4, Calif.

bar of floating soap, and other items of paramount importance too numerous to mention here.

AS EVERYONE KNOWS, fishes are not horses and horses would look just as silly in an aquarium as fishes would in the Kentucky Derby. Therefore, technically speaking, the term "horse-traders" as applied to the personnel of the Academy's famed Steinhart Aquarium and that of almost every other aquarium in the world is probably a misnomer.

If the time-honored techniques of horse-trading were not applied to the acquisition of piscatorial specimens, however, aquariums would not be as fascinating as they are. Every aquarium (ask the man who runs one) displays fishes native to waters hundreds and thousands of miles away for which have been bartered specimens from the aquarium's home waters.

A typical bartering session between, say, Steinhart Aquarium and the Fort Worth, Texas, Aquarium might sound something like this:

Steinhart aquarist, on telephone: "Leopard sharks! Have we got any? We've got so many leopard sharks we've got spots before our eyes. (Leopards, of late, have been present in San Francisco Bay waters in abundance, not to mention superabundance.) How many do you want? You're sure that's enough? Right, we can get them on an early flight tomorrow; I'll wire details of arrival and so forth. Don't mention it, we're glad to do it."

"Oh no, that's not necessary, I didn't call you to get something out of you."—(In front of aquarist is note which reads: "Today. Call Fort Worth re alligator gars." In eyes of aquarist is unmistakably acquisitive gleam.)—"No, really, I can't think of a thing you might send. No, no, I wouldn't think of it."

"No, honestly, the tank we'll take the leopards out of

is too big for anything but alligator gars or something like that. Is that right? Extra gars? Now, I don't want you to think . . . You're sure?"

"Wel-l-l-l-l, I suppose, in a pinch, we could take half a dozen or so gars off your hands, I mean, if they're in your way but don't think for a minute you have to . . . well, okay, I'll expect a wire tomorrow saying when gars will arrive. Oh yes, I'll wire tonight about the leopards. And thanks, I really didn't expect any return. Goodbye."

(Aquarist puts down phone, crumples note and tosses it in trash can, walks away from desk whistling.)

HIS EAR EVER ATTUNED for unusual twists of phrase, Dr. Robert C. Miller, Director of the Academy, reports that at a recent forum in Monterey, he heard a speaker use one of the smoothest possible means of slipping a story into his speech.

Shortly after the speaker had started to speak, he said: "and that reminds me of a story someone asked me to tell; at least, I think he asked me; if he didn't, he would have if he had thought of it."

By the time the audience had hurdled this, the speaker was well-launched into the story.

YES WE
HAVE



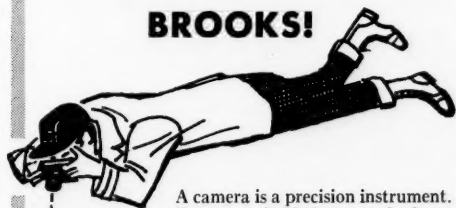
Back Numbers

MOST ISSUES STILL IN PRINT
\$2.50 PER VOLUME

SEND CHECK TO

PACIFIC DISCOVERY, SAN FRANCISCO 18

**People who appreciate
quality shop at
BROOKS!**



A camera is a precision instrument. It is remarkable how much clever designing and delicate machining is involved in even the most inexpensive ones. As the demands made upon the camera increase, its complexities increase proportionately. One faith shared alike by the entire spectrum of camera fans, from the dear old lady with the used box camera to the bemused Hasselblad owner is that Brooks stands solidly behind every camera it sells or services. So if your forte is gat-toothed babies, oceanography or the Corona Australis, Brooks has the camera (and the advice) for you.

BROOKS CAMERAS

FREE PARKING, Barrett's Garage, 130 Kearny,
with \$3 purchase

BUDGET TERMS AVAILABLE, open 9 to 6 p.m.
daily, Mondays 'til 9 p.m.


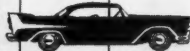
EASY CHAIR COMFORT



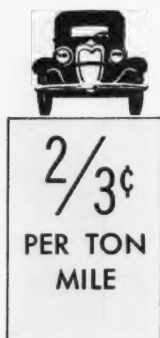
LONG RUGGED WEAR



AMERICA'S FINEST OVERALL
Since 1850

1930	25 TON MILES PER GALLON
	
1958	43 TON MILES PER GALLON
	

Today's gasoline has far more value. An accurate way to measure this value is by "ton-miles"...the number of miles a gallon of gasoline will move a ton of car. Average performance in 1930 was 25 ton-miles per gallon. Today it's 43 — or 70% more work per gallon.



Fuel cost per ton mile is down 18% since 1930. To move a ton of car a mile took $\frac{2}{3}$ ¢ worth of fuel. Modern gasolines move today's heavier cars a ton-mile for about $\frac{1}{2}$ ¢. When you remember you are buying performance, gasoline costs less today than in 1930.



In spite of higher operating costs in the oil industry, gasoline prices have been held down through research and intense competition. Since 1930 the price of gasoline (excluding taxes) rose only 23%. During the same period the general cost of living went up 70%.



The taxes on a tankful of gasoline would buy between four and five extra "tax-free" gallons. Combined state and federal taxes, which help pay for better roads, add about 9¢ to the price of every gallon... nearly 30% of your gasoline dollar buys no gasoline at all.



STANDARD OIL COMPANY OF CALIFORNIA *plans ahead to serve you better*



Can you think of any liquid that costs less than gasoline . . . except water?

Quart for quart, gallon for gallon, almost any liquid you buy costs more than gasoline . . . and gasoline performance today costs less than it did in 1930.

